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FURUNO

INSTALLATION MANUAL

MARINE RADAR MODEL1823C-BB
MARINE RADAR MODEL1833C-BB
MARINE RADAR MODEL1933C-BB
MARINE RADAR MODEL1943C-BB
MARINE RADAR MODEL1953C-BB
COLOR VIDEO PLOTTER GD-1900C-BB

NAVnet

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

PRINTED IN JAPAN

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9-52 Ashihara-cho,
Nishinomiya 662-8580, JAPAN

Telephone : 0798-65-2111
Fax : 0798-65-4200

Your Local Agent/Dealer

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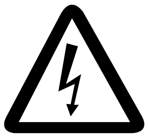
(AKMU) M1803C-BB_GD1900C-BB

00014791603

IME35320D00

⚠ SAFETY INSTRUCTIONS

⚠ WARNING



Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Turn off the power at the mains switchboard before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ CAUTION

Observe the following compass safe distances to prevent deviation of a magnetic compass.

	Standard	Steering
Processor unit	1.75 m	1.10 m
Control unit	0.45 m	0.30 m
MODEL1823C-BB antenna unit	1.25 m	0.85 m
MODEL1833C-BB antenna unit	0.90 m	0.70 m
MODEL1933C-BB antenna unit	1.00 m	0.80 m
MODEL1943C-BB antenna unit	1.00 m	0.80 m
MODEL1953C-BB antenna unit	1.00 m	0.75 m
Power supply unit (1953C-BB)	1.40 m	0.95 m
Memory card I/F unit	0.90 m	0.60 m

⚠ WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

Distances at which RF radiation levels of 100 and 10 W/m^2 exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible - Ask your FURUNO representative or dealer to provide this feature.

MODEL		Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
MODEL 1823C-BB		Nil	0.5 m
MODEL 1833C-BB		Nil	1.8 m
MODEL 1933C-BB		Nil	2.7 m
MODEL 1943C-BB		Nil	1.9 m
MODEL 1953C-BB	XN12A	Nil	2.5 m
	XN13A		2.3 m

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EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Control unit	RCU-017	-	1	
Processor unit	RPU-014	-	1	
Antenna unit	RSB-0094-0075	-	1	MODEL1823C-BB
	RSB-0071-057	-		MODEL1833C-BB
	XN10A-RSB-0070-064	-		MODEL1933C-BB, 24 rpm
	XN10A-RSB-0073-064	-		MODEL1933C-BB, 48 rpm
	XN12A-RSB-0070-059	-		MODEL1943C-BB, 24 rpm
	XN12A-RSB-0073-059	-		MODEL1943C-BB, 48 rpm
	XN12A-RSB-0072-060	-		MODEL1953C-BB, 4ft, 24 rpm
	XN12A-RSB-0073-060	-		MODEL1953C-BB, 4ft, 48 rpm
	XN13A-RSB-0072-060	-		MODEL1953C-BB, 6ft, 24 rpm
Power supply unit	PSU-005	-	1	For MODEL 1953C-BB
Memory card interface unit	CU-200-NAVBB-5	-	1	W/5m cables
	CU-200-NAVBB-10	-		W/10m cables
Installation materials	CP03-26000	000-080-049	1set	MJ-A7SPF0006-050 For control unit
	CP03-26100	000-080-536		MJ-A7SPF0006-100 For control unit
	CP03-25900	000-080-542	1	For Processor unit MJ-A3SPF0018-050Z, CP03-25901
	CP03-25401	008-443-160	1set	For MODEL1823C-BB antenna unit
	CP03-16901	008-478-750	1set	For MODEL1833C-BB antenna unit
	CP03-21800	000-080-014	1	For MODEL1823C-BB/1833C-BB 10 m signal cable
	CP03-21810	000-080-015		For MODEL1823C-BB/1833C-BB 15 m signal cable
	CP03-21820	000-080-016		For MODEL1823C-BB/1833C-BB 20 m signal cable
	CP03-21830	000-080-017		For MODEL1823C-BB/1833C-BB 30 m signal cable
	CP03-22000	000-080-021	1	For 1933C-BB/1943C-BB/1953C-BB 10 m signal cable
	CP03-22010	000-080-022		For 1933C-BB/1943C-BB/1953C-BB 15 m signal cable
	CP03-22020	000-080-023		For 1933C-BB/1943C-BB/1953C-BB 20 m signal cable
	CP03-22030	000-080-024		For 1933C-BB/1943C-BB/1953C-BB 30 m signal cable
	CP03-18401	008-503-360	1	For 1933C-BB/1943C-BB/1953C-BB antenna unit
	CP03-22901	008-523-690	1	For 1933C-BB/1943C-BB/1953C-BB antenna radiator XN10A/XN12A
	CP03-24500	000-080-191	1	For 1953C-BB, power supply unit
	CP03-27401	008-539-520	1	For CU-200 flush mount
Accessories	FP03-09301	008-522-970	1set	Card remover
	FP03-10001	008-537-530	1	For RCU-017
	06-021-2121	100-320-101	1	Hard cover
Spare parts	SP03-14501	008-444-420	1set	Fuses, for processor unit
	SP03-14001	000-080-018	1set	Fuses, for power supply unit (1953C-BB only)

Optional supply

Name	Type	Code No.	Qty	Remarks
Rectifier	PR-62	000-013-484	1	For GD-1900C-BB, 100 VAC
		000-013-485		For GD-1900C-BB, 110 VAC
		000-013-486		For GD-1900C-BB, 220 VAC
		000-013-487		For GD-1900C-BB, 230 VAC
	RU-3423	000-030-443	1	For MODEL series
External buzzer	XH3-BZ-L970	000-146-422	1	
Cable assy.	MJ-A6SPF0014-010	000-144-421	1	For NavNet, 1 m
	MJ-A6SPF0014-050	000-144-422	1	For NavNet, 5 m
	MJ-A6SPF0014-100	000-144-423	1	For NavNet, 10 m
	MJ-A6SPF0014-200	000-144-424	1	For NavNet, 20 m
	MJ-A6SPF0014-300	000-144-425	1	For NavNet, 30 m
	MJ-A6SPF0012-050	000-134-424	1	For navaid, 5 m, 6P-6P cross
	MJ-A6SPF0012-100	000-133-817	1	For navaid, 10 m, 6P-6P cross
	MJ-A6SPF0003-050	000-117-603	1	w/6P connector, 5 m
	MJ-A6SPF0009-100	000-125-236	1	w/6P connector, 10 m
	MJ-A6SPF0007-100	000-125-237	1	For compass, 10 m, 6P-6P straight
	MJ-A7SPF0007-050	000-144-418	1	w/7P connector, 5 m
	MJ-A6SRMD/TM11AP8-005	000-144-463	1	Adapter cable for HUB
	3COX-2P-6C 5M	000-146-500	1	For monitor D-sub 15
	3COX-2P-6C 10M	000-146-501	1	
	MJ-B24LPF0010-100	000-147-880	1	For remote display, 10 m
	MJ-B24LPF0010-200	000-147-881	1	For remote display, 20 m
	MJ-B24LPF0010-300	000-147-882	1	For remote display, 30 m
ARP kit	ARP-11	008-523-050	1	ARP Board, for radar only
Mounting bracket (1)	OP03-92	008-445-070	1	For MODEL1833C-BB
Mounting bracket (2)	OP03-93	008-445-080	1	For MODEL1823C-BB
Chart card	-		-	Specified when ordering.
RAM card	00RAM08MC-0015	004-376-740	1	8 MB
EMI core	CP03-24801	008-481-410	1	For remote display cable connection
Ring unit	MU3721	000-144-645	1	For trackball of control unit
Desktop mount kit	FP03-09901	008-443-540	1	For control unit RCU-017
	FP03-10201	008-539-530	1	For memory card IF CU-200

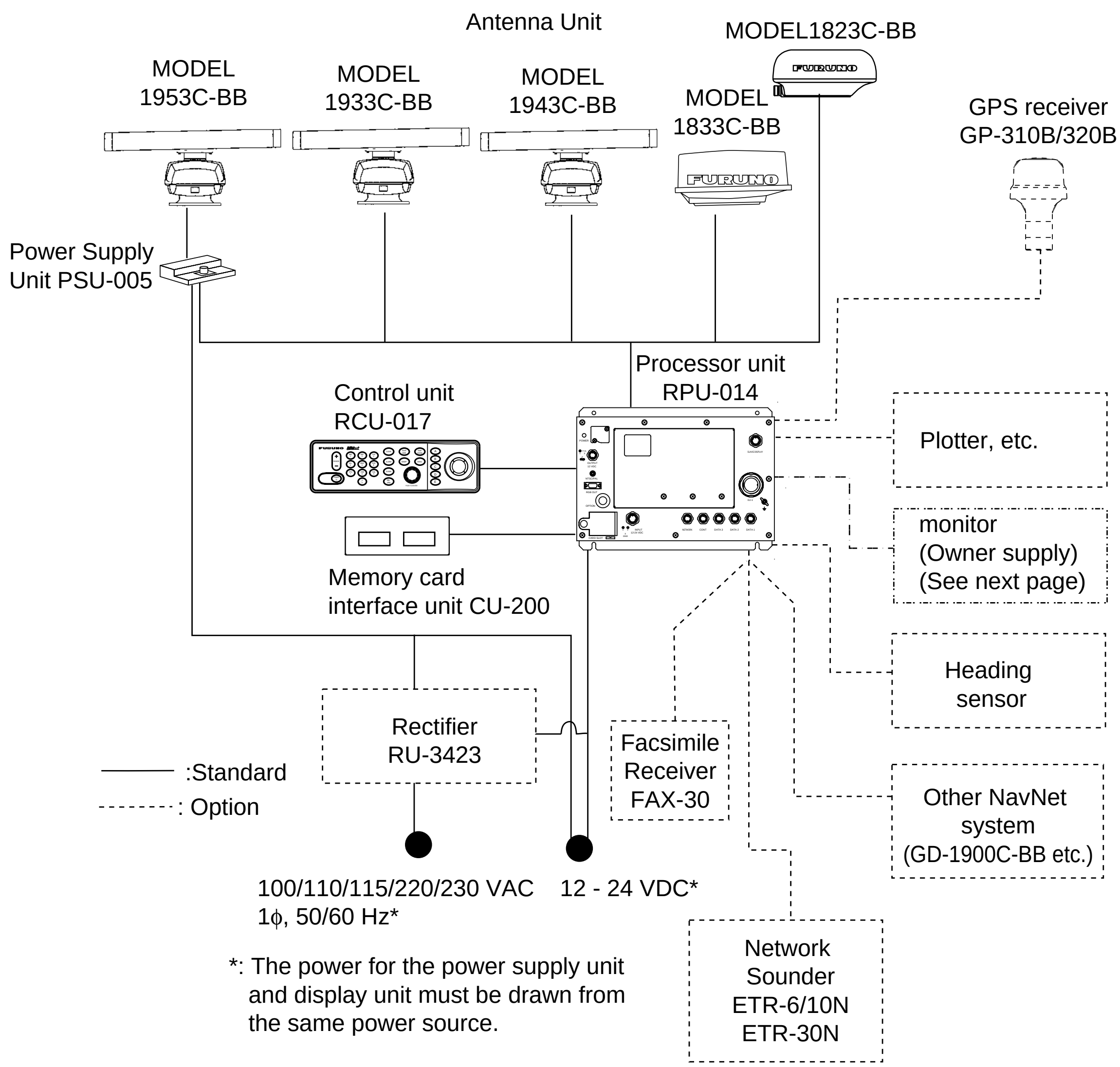
SYSTEM CONFIGURATIONS

All NavNet products incorporate a "network circuit board" to integrate each NavNet product on board through an optional LAN cable (Ethernet 10BASE-T). Each NavNet product is assigned an IP address to enable transfer of images between other NavNet products. For example, video plotter pictures can be transferred to a radar and vice versa. Pictures received via the NavNet may be adjusted at the receiving end.

The number of processor units which may be installed depends on the number of network sounder connected. For a system incorporating three or more products, a "hub" is required to process data.

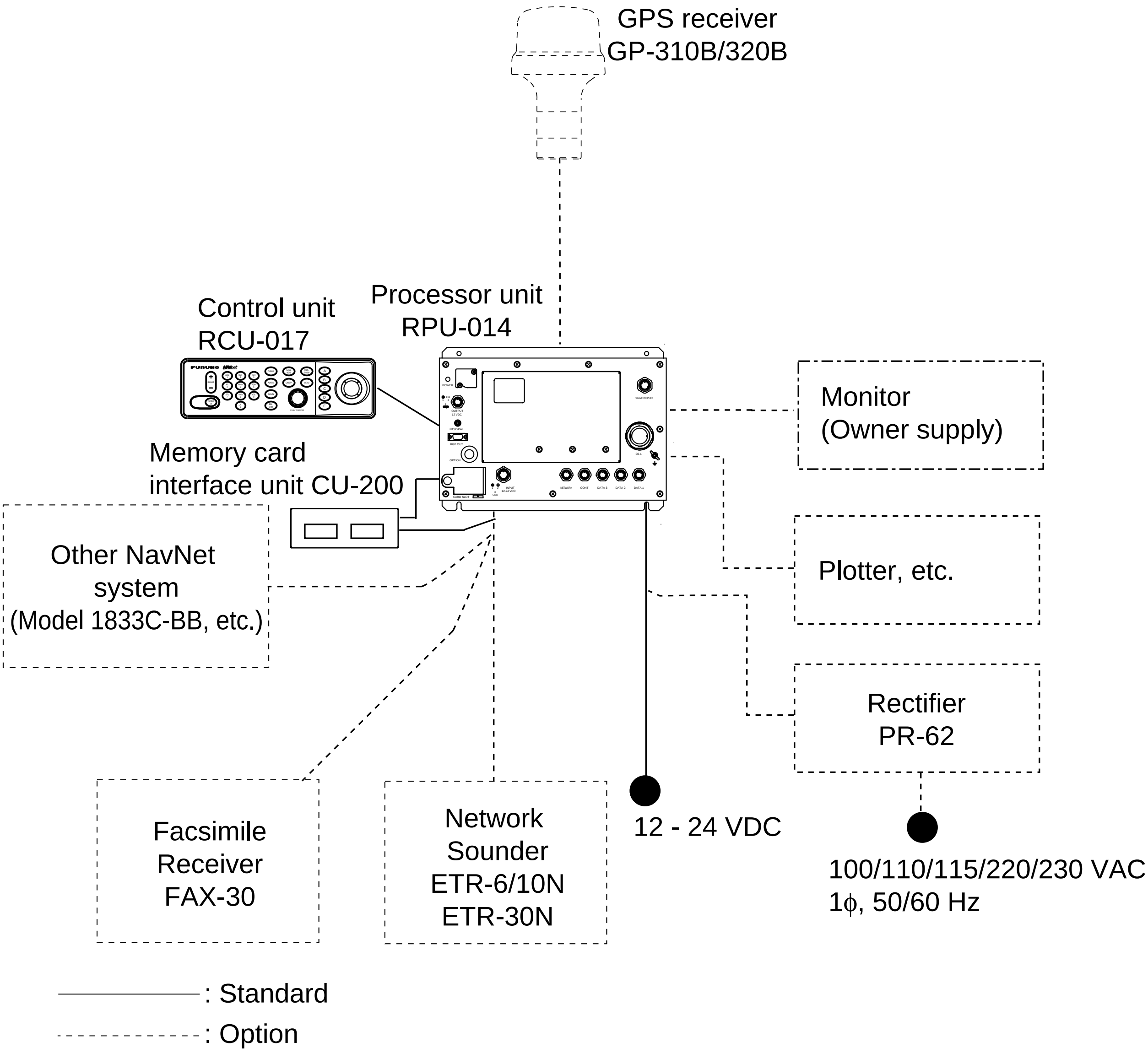
For one network sounder: one radar and three plotters, or four plotters
For two network sounder: one radar and two plotters, or four plotters

<u>NavNet system (Model 1823C-BB/1833C-BB/1933C-BB/1943C-BB/1953C-BB)</u>



NavNet system (Model 1823C-BB/1833C-BB/1933C-BB/1943C-BB/1953C-BB)

Single-unit NavNet system (GD-1900C-BB)



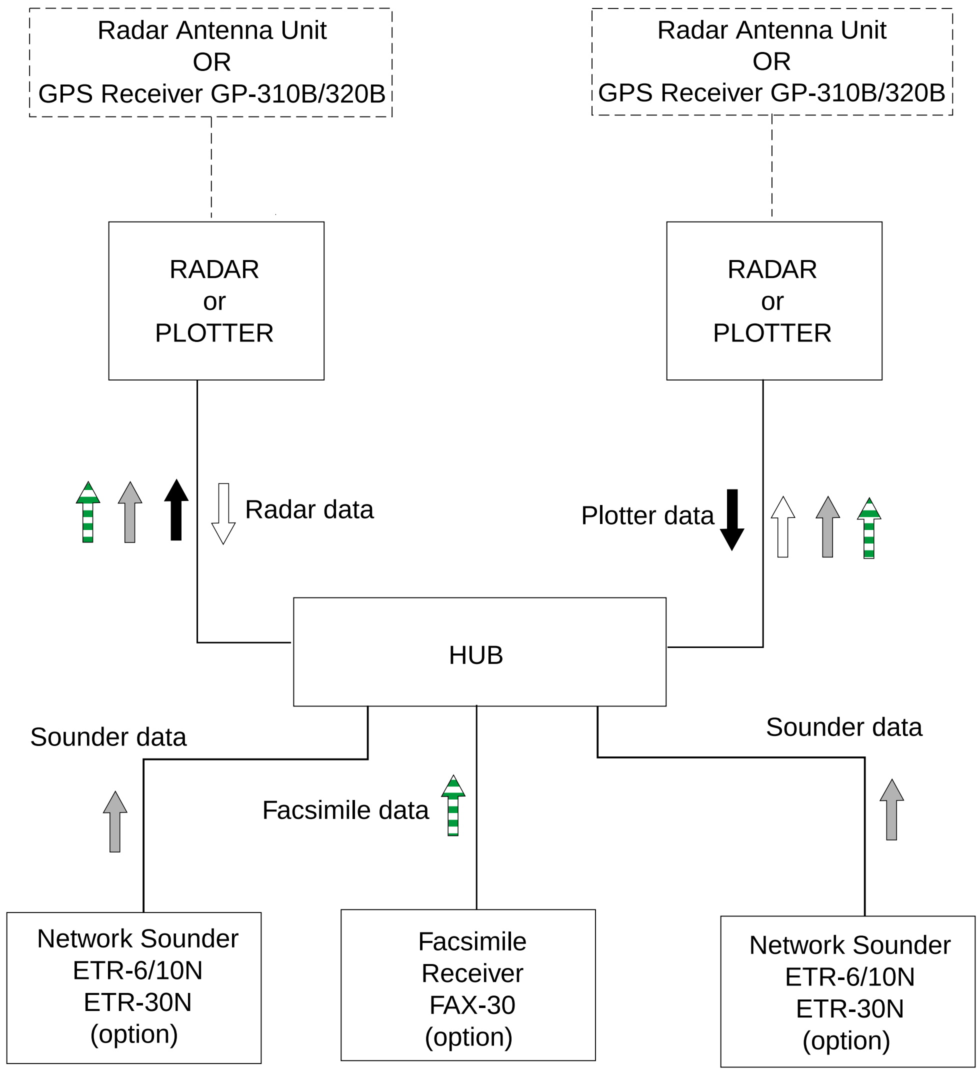
Single-unit NavNet system (GD-1900C-BB)

Note: The output signal from the processor unit for a monitor is as follows.

RGB signal: Analog 0.7 Vpp, Output impedance 75 Ω
Synchro signal: H 31.5 kHz, V 60Hz (Separate), TLL level
(VGA signal)

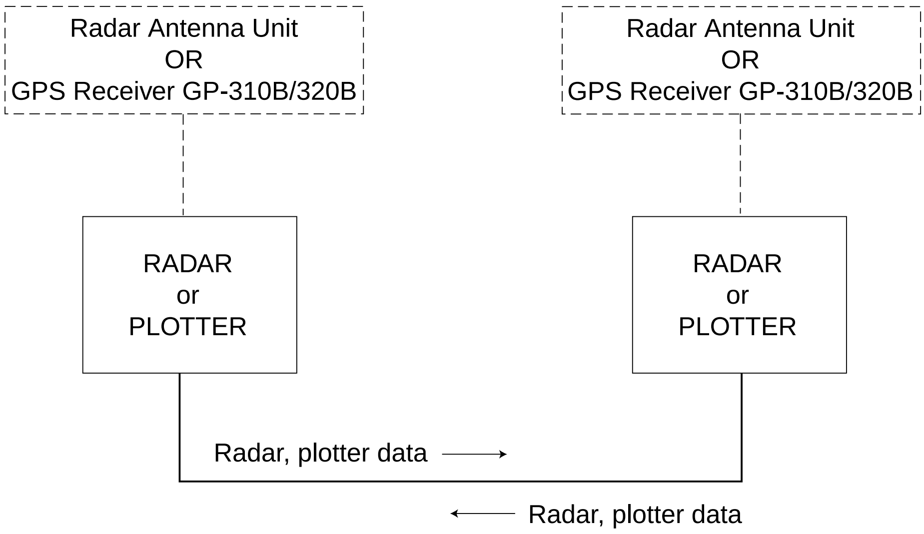
Choose a monitor whose aspect ratio is 4:3, for example, VGA, SVGA, XGA, SXGAX, VXGA, QXGA, etc

Three-or-more-unit NavNet system



Three-or-more-unit NavNet system

Two-unit NavNet system



Two-unit NavNet system

1. MOUNTING

1.1 Mounting the Control Unit

The control unit can be installed on a desktop or flush mounted in a console or panel. For flush mounting, the optional flush mount kit is required.

When selecting a mounting location for the control unit keep the following in mind:

- Keep the control unit out of direct sunlight.
- The temperature and humidity of the mounting location should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away from electromagnetic field generating equipment such as motor, generator.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables.
- A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the following compass safe distances to prevent disturbance to the magnetic compass.

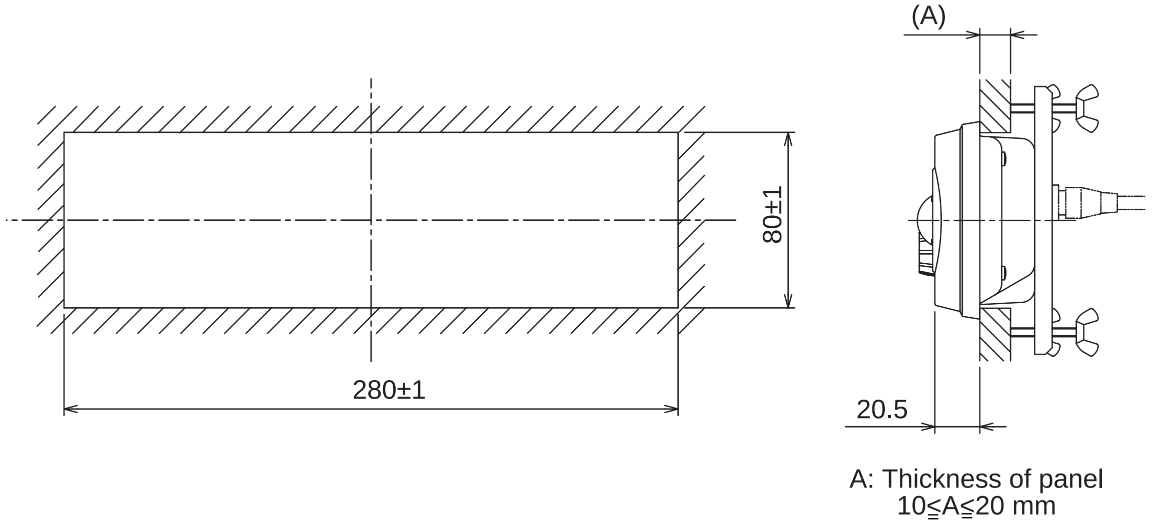
  Standard compass: 0.45 m
  Steering compass: 0.30 m

Mounting procedure

Flush mounting

Follow the procedure below to mount the control unit on a panel with accessories FP03-10001.

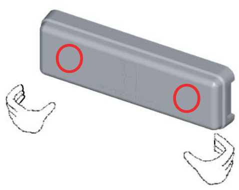
1. Prepare a cutout in the mounting location, referring to the outline drawing at the end of this manual.
2. Set the control unit to the cutout.
3. Attach the mounting plate to the control unit with four screws M4 x 10 from the rear side.
4. Screw four wing bolts into wing nuts.
5. Fasten the control unit to the mounting location with four wing bolts and wing nuts assembled at step 4.



Flush mounting of display unit

6. Attach hard cover to protect the control unit.

How to remove the hard cover
Place your thumbs at the locations shown with circles in the illustration at right, and then lift the cover while pressing it with your thumbs.

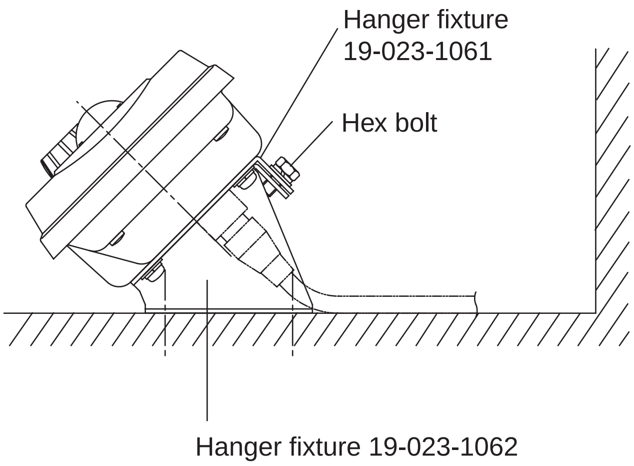


Desktop mounting

Use the optional desktop mount kit FP03-09901 (Code number 008-443-540).

No.	Name	Type	Code No.	Qty
1	Hanger fixture	19-023-1061	100-307-941	1
2	Hanger fixture	19-023-1062	100-307-951	1
3	Tapping screw	5 x 20	000-802-081	4
4	Hex bolt	M5 x 10	000-802-288	2

1. Fix the hanger fixture 19-023-1062 on a desktop with four tapping screws (5x20).
2. Fix the hanger fixture 19-023-1061 to the rear panel of the control unit with four M4x10 (supplied as accessories).
3. Set the control unit to the hanger fixture 19-023-1062 fixed at step 1 and fit it with two hex bolts.



Desktop mounting of display unit

4. Attach hard cover to protect the control unit.

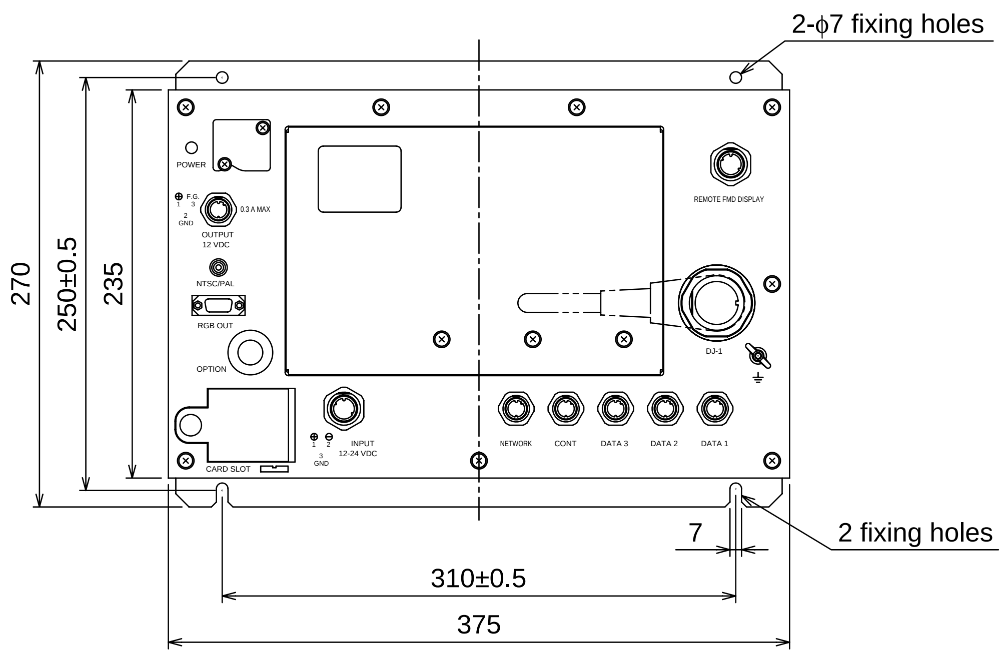
1.2 Mounting the Processor Unit

The unit can be mounted on the deck, a desktop or on a bulkhead. Select a mounting location considering the points below.

- Locate the unit out of direct sunlight.
- Select a location where temperature and humidity are moderate and stable.
- Consider the length of the cable connected among the processor unit, antenna unit (or power supply unit) and control unit.
- For mounting on a bulkhead, be sure the mounting location is strong enough to support the unit (4.1kg) under the pitching and rolling normally encountered on the vessel.
- Leave sufficient space around the unit for maintenance and servicing. Recommended maintenance space appears in the outline drawing at the back of this manual.
- A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the following compass safe distances to prevent disturbance to the magnetic compass.

Standard compass:	1.75 m
Steering compass:	1.10 m

Tabletop or deck mounting: Fasten with four tapping screws.
Bulkhead mounting: Mark four fixing hole positions on the bulkhead. Screw in two tapping screws at lower fixing positions, leaving 5 mm protruding. Set the processor unit to the screws and screw in two tapping screws at upper positions. Tighten all screws.



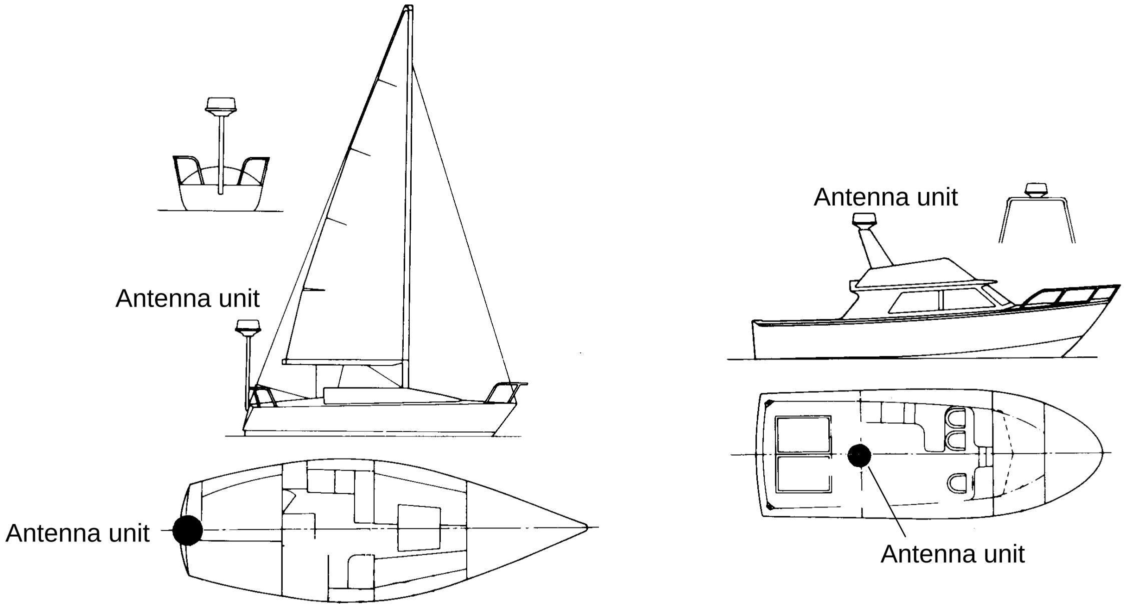
Processor unit, mounting dimensions

1.3 Mounting the Antenna Unit of MODEL1823C-BB

Mounting considerations

When selecting a mounting location for the antenna unit keep in mind the following points.

- Install the antenna unit on the hardtop, radar arch or on a mast on an appropriate platform. (For sailboats, a mounting bracket is optionally available.) It should be placed where there is a good all-round view with, as far as possible, no part of the ship's superstructure or rigging intercepting the scanning beam. Any obstruction will cause shadow and blind sectors. A mast, for instance, with a diameter considerably less than the width of the antenna unit, will cause only a small blind sector. However, a horizontal spreader or crosstrees in the same horizontal plane would be a much more serious obstruction; place the antenna unit well above or below it.

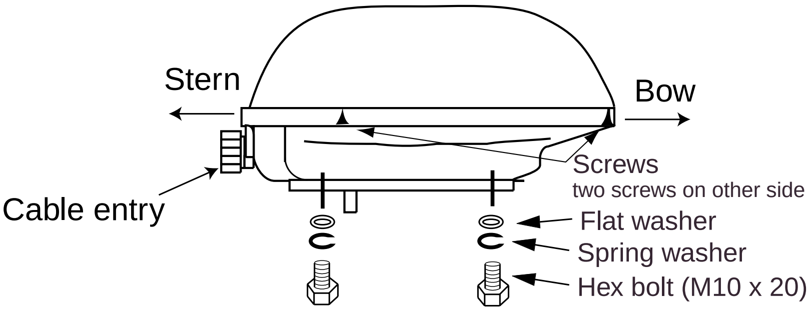


Typical antenna unit placement on sailboat and powerboat

- In order to minimize the chance of picking up electrical interference, avoid where possible routing the antenna cable near other electrical equipment onboard. Also avoid running the cable in parallel with power cables.
- The compass safe distance of 1.25 meters (standard compass) and 0.85 meters (steering compass) should be observed to prevent deviation of the magnetic compass.

Mounting the antenna unit of MODEL1823C-BB

1. Remove mounting hardware at the bottom of the antenna unit; four each of hex. bolts (M10X20), spring washers and flat washers. Save mounting hardware to use it to fix the antenna unit to the mounting platform later on.



Antenna unit, showing location of mounting hardware

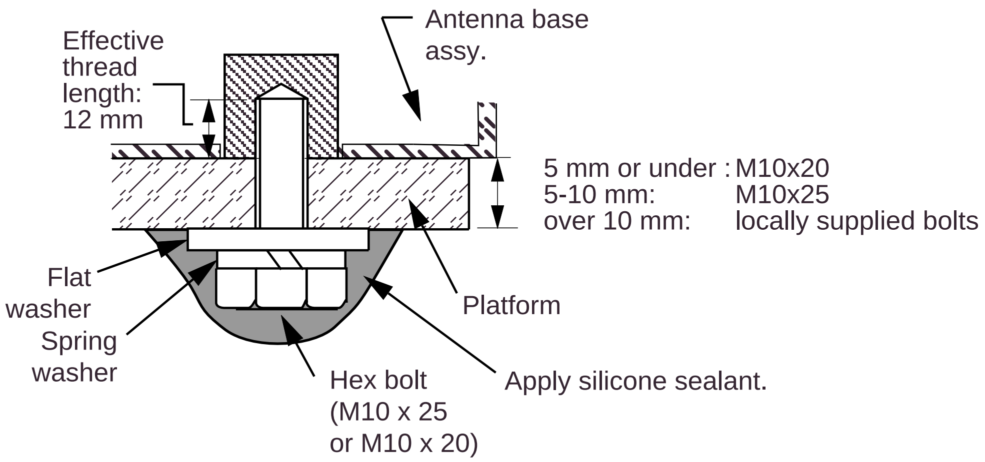
2. Construct a platform (wood, steel*, or aluminum) of 5-10 mm (recommended dimension) in thickness referring to the outline drawing at back of this manual. A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-11.) Fasten the platform to the mounting location. Next, position the mounting base on the platform so the cable entrance faces the stern direction.

   *: For steel platform take appropriate measures to prevent corrosion.

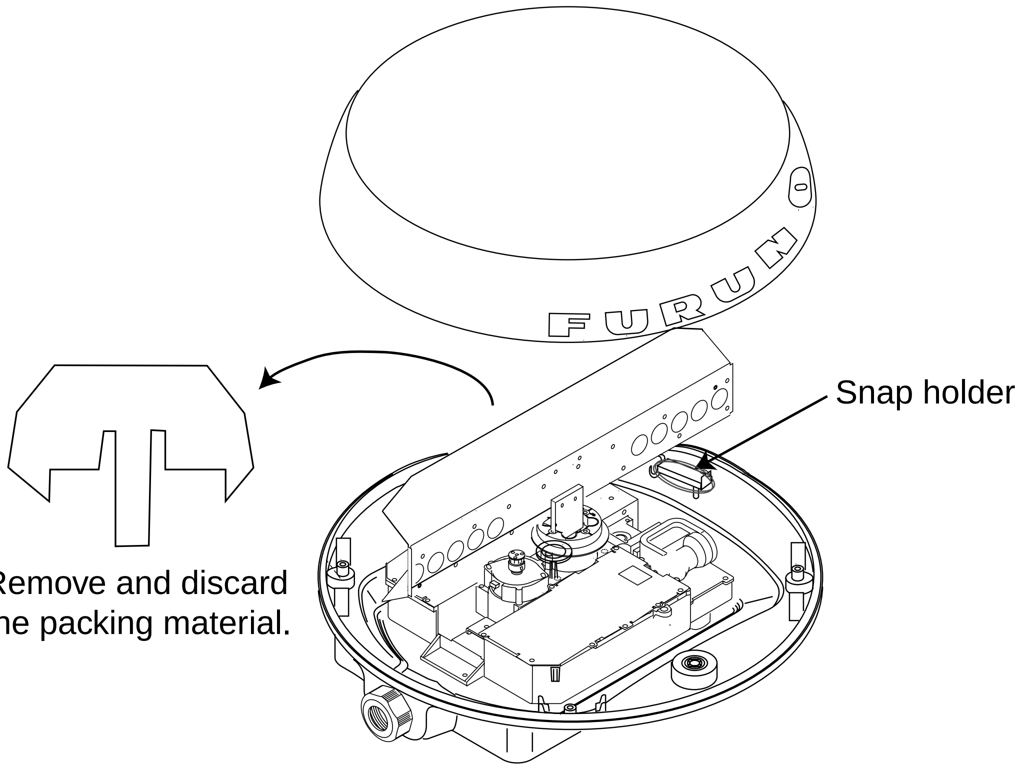
Note: When drilling holes in the platform, be sure they are parallel with the fore and aft line.

3. Using the hex bolts, flat washers and spring washers removed at step 1, fasten the mounting base to the platform. **The torque should be between 19.6-24.5 N•m.**

Note: Longer hex bolts (M10X25) are supplied with the installation materials. Use them instead of the hex bolts removed earlier if the mounting platform thickness is 5–10 mm.



How to fasten the mounting base to platform



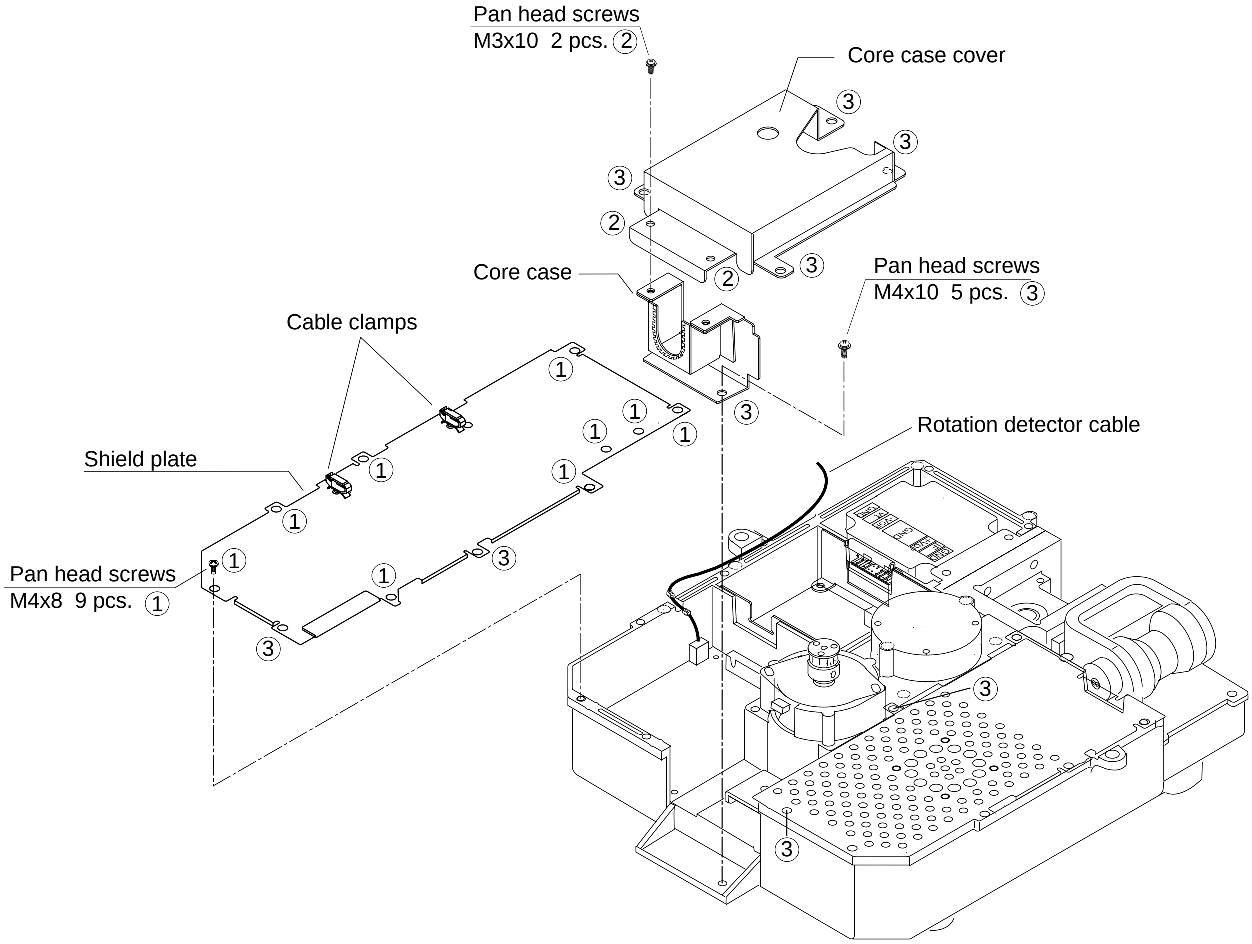
Antenna unit, inside view

4. The mounting base is fitted with a snap holder, which may be used to hang the cover after removal. Use the hole next to screw hole inside the cover to hang it.

    a) Unfasten the snap assy. with the string attached at the holder in the mounting base.
    b) Unwind the string.
    c) Attach the snap to a screw hole on the inside of the cover.

    Note: Do not hang any other objects with the snap.

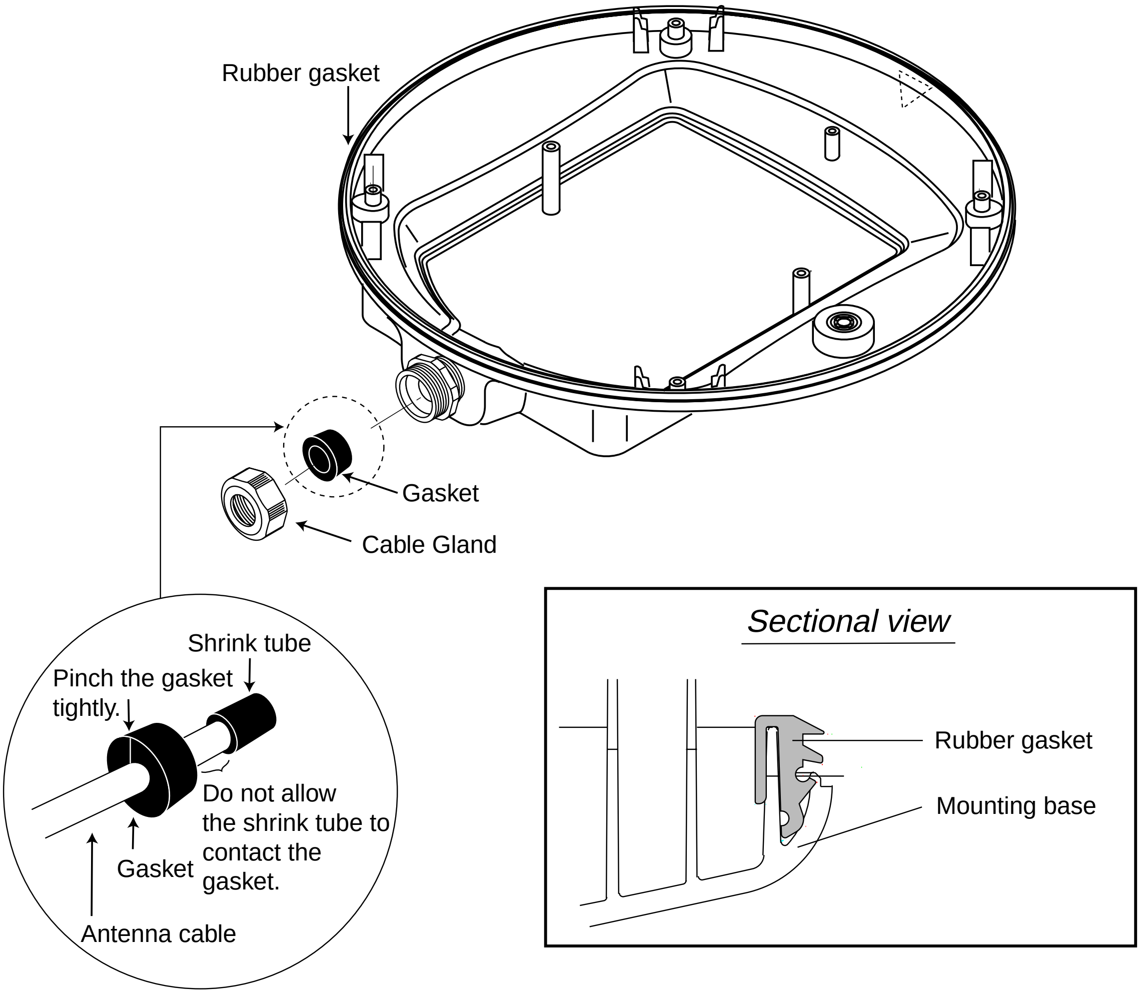
5. Unfasten the rotation detector cable from the cable clamps.
6. Unfasten 16 screws (①, ② and ③ in the following figure) to dismount the shield plate, core case and core case cover.



Caution: Be careful not to pinch the rotation detector cable when remounting the shield plate.

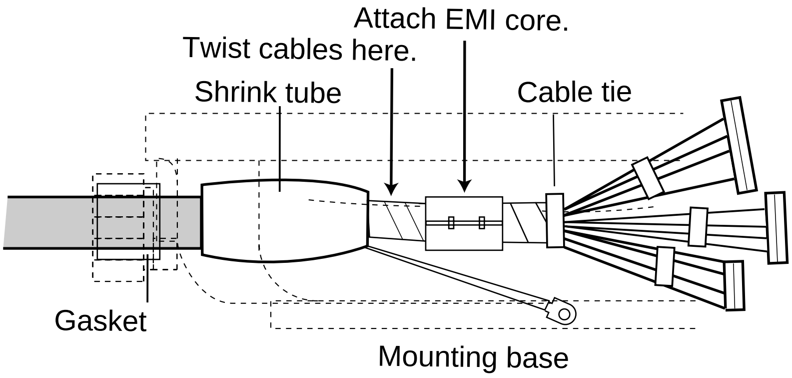
7. Pass the antenna cable with connector through the cable gland, gasket and cable entrance of the antenna unit, and then tighten cable gland.

Note 1: Be sure the shrink tube on the antenna cable does not contact the gasket.
Note 2: Pinch the gasket tightly and insert it into the cable entrance. Confirm that the slit in the gasket is completely closed after inserting it into the cable entrance.



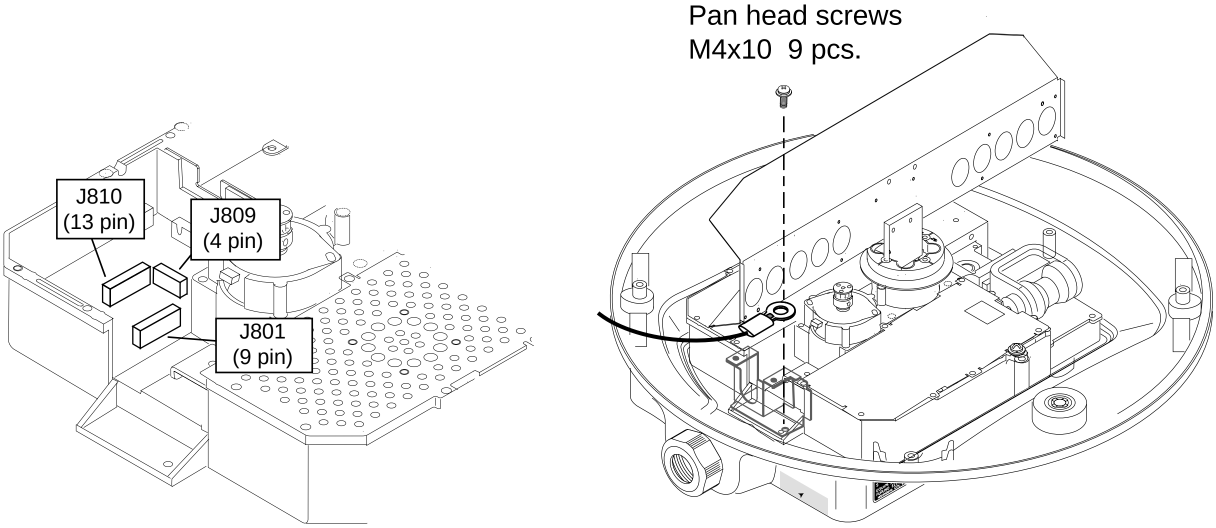
Antenna unit, inside view

8. Twist antenna connector cables at the position between the shrink tube and the cable tie, and then attach EMI core (supplied) to cables as follows. After attachment, shift EMI core slightly to confirm that it does not pinch cables.



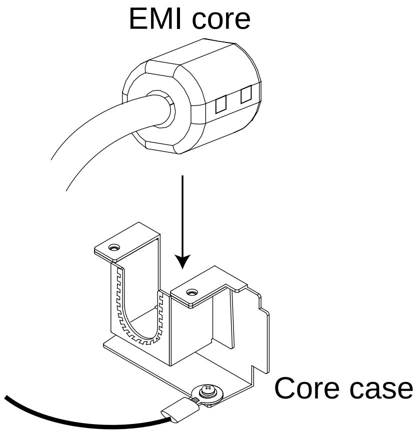
Location of EMI core

9. Attach connectors of the antenna cable to the locations shown in the figure below, and then fasten a pan head screw M4x10 to fix shield cable and core case (removed at step 6.)



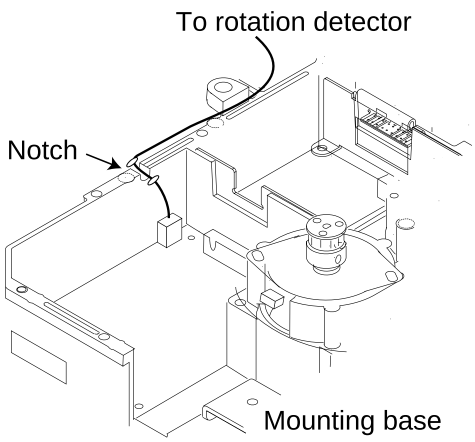
Antenna unit, connector location and fixing the shield cable w/core case

10. Put the EMI core on the antenna cable into the core case attached at step 9.
The flat side of the core should face downward.



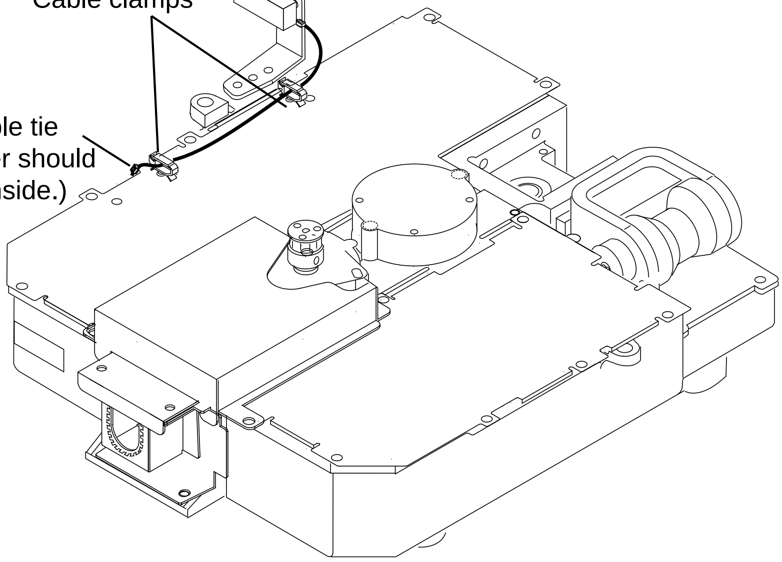
EMI core, putting into core case

11. Refasten the shield plate and core case cover with 15 screws. Be sure that the cable from the rotation detector passes through the notch between the two cable ties.



How to pass the rotation detector cable

12. Pass the cable from the rotation detector through two cable clamps.



Antenna unit, clamping the rotation detector cable

13. Follow the instructions on the label inside the mounting base to secure the snap assy.
14. Confirm that the rubber gasket is properly positioned and that the triangle mark on the radome cover is aligned with the triangle mark on the mounting base, then tighten the fixing screws for the cover. Refer to the figure of sectional view on the previous page for positioning of rubber gasket.

Mounting the optional mounting bracket

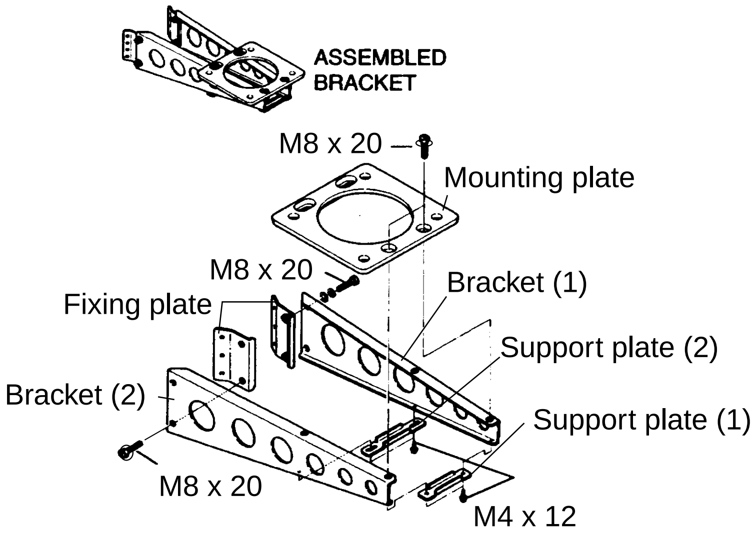
A mounting bracket for fastening the antenna unit to a mast on a sailboat is optionally available.

Mounting bracket 2

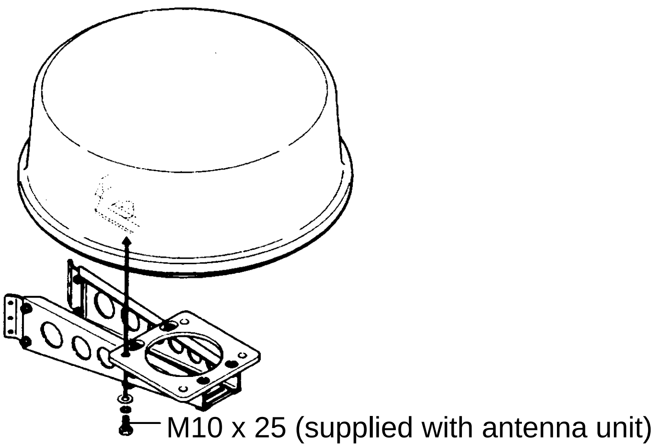
Type: OP03-93
Code No.: 008-445-080

	Type	Code No.	Qty
Hex. bolt	M4x12	000-804-725	4
Hex. bolt	M8x20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-028-9101-0	100-206-810	1
Bracket (2)	03-028-9102-0	100-206-820	1
Fixing plate	03-028-9103-0	100-206-830	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket. For details, see the figure on the next page.



(A) Assembling the mounting bracket



(B) Fastening antenna to mounting bracket

How to assemble and mount the optional mounting bracket

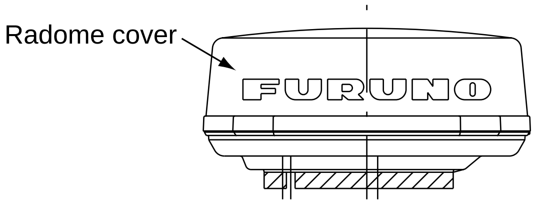
1.4 Mounting the Antenna Unit of MODEL1833C-BB

Mounting considerations

See the mounting considerations for the MODEL1823C-BB on page 1-5.
The compass safe distance of 0.90 meters (standard compass) and 0.70 meters (steering compass) should be observed to prevent deviation of the magnetic compass.

Mounting the antenna unit of MODEL1833C-BB

1. Open the antenna unit packing box carefully.
2. Unbolt the four bolts at the base of the radome cover to remove it.

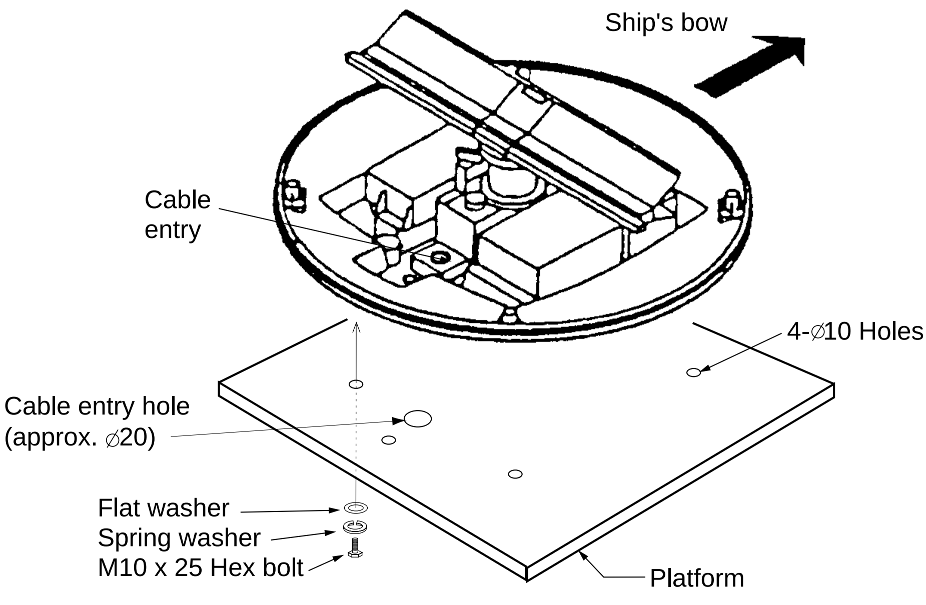


Antenna unit

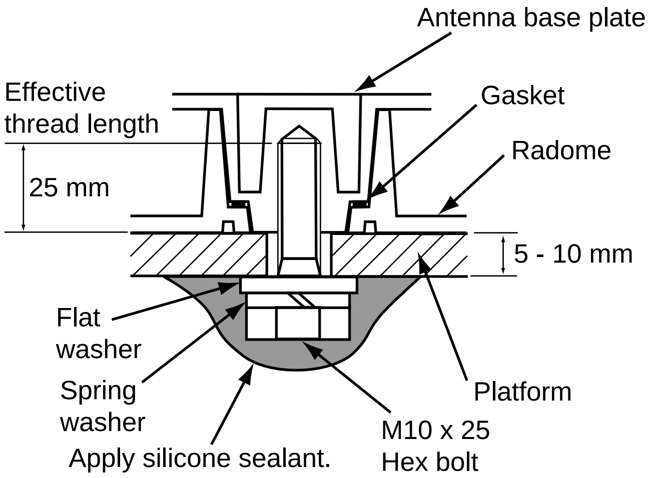
The mounting surface must be parallel with the waterline and provided with five holes (four fixing holes and one cable entry) whose dimensions are shown in the outline drawing attached at back of this manual.

The unit is adjusted so a target echo returned from the bow direction will be shown on the zero degree (heading line) position on the screen. When drilling holes, be sure they are parallel with the fore and aft line.

3. Prepare a platform (wood, steel*, or aluminum) of 5 to 10 millimeters in thickness for the antenna unit.
   A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-17.) Find the cable entry on the radome base. Next, position the radome base so the cable entry faces the stern direction. This alignment must be as accurate as possible.
   *: For steel platform, take appropriate measures to prevent corrosion.



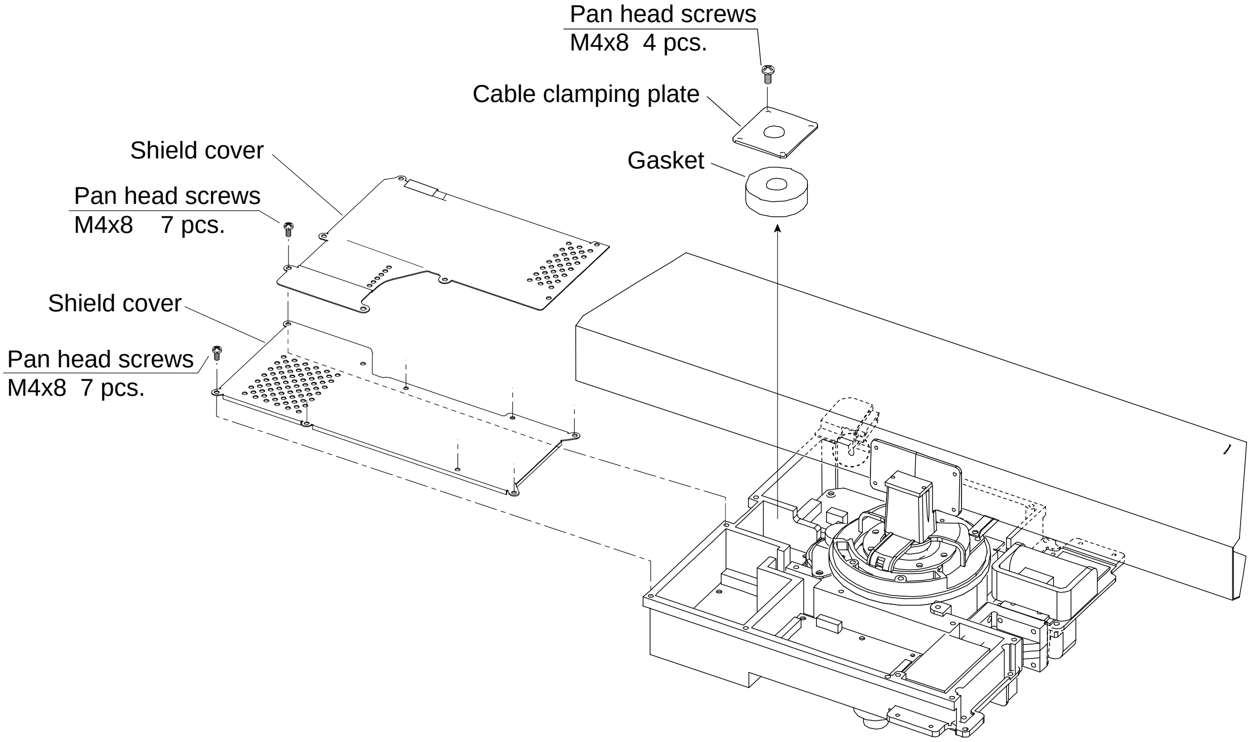
Antenna unit, cover removed



How to fasten the radome base to the mounting platform

Wiring and final preparation

4. Drill a hole of approx. 20 mm diameter through the deck or bulkhead to run the signal cable between the antenna unit and the processor unit. (To prevent electrical interference avoid running the signal cable near other electrical equipment and in parallel with power cables.) Pass the cable through the hole. Then, seal the hole with sealing compound for waterproofing.
5. Remove two shield covers in the radome.
6. Remove the cable clamping plate by unfastening four screws and removing a gasket.

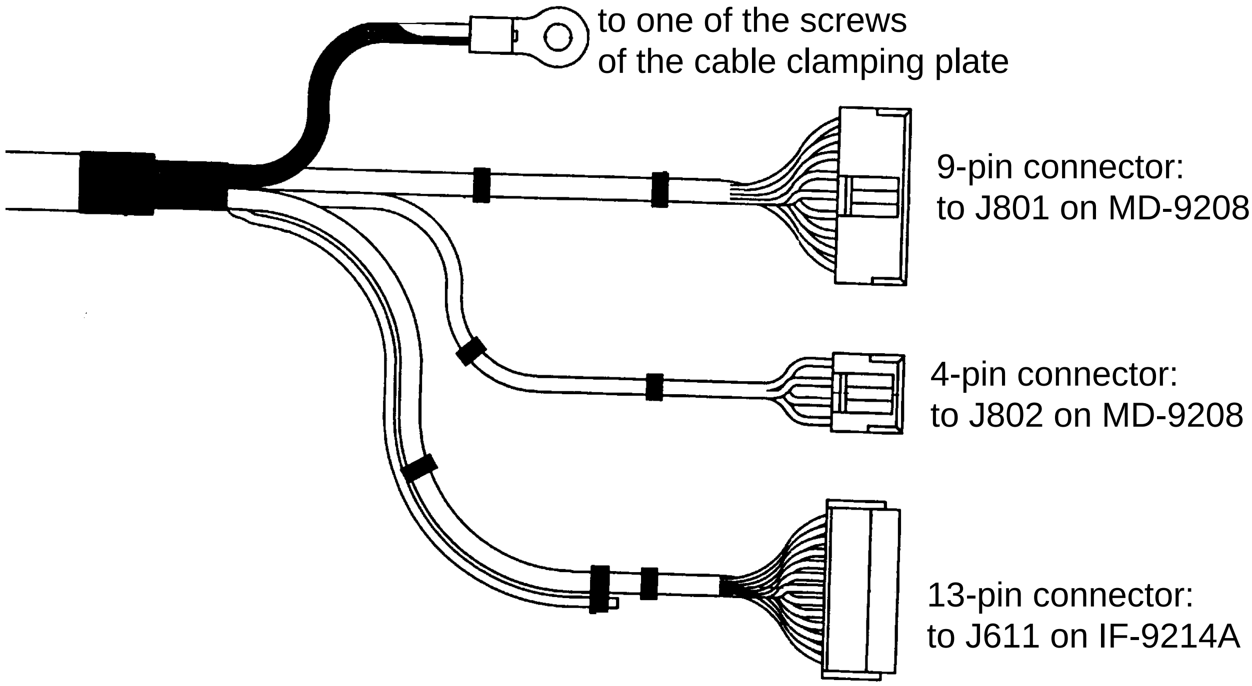


Antenna unit, inside view

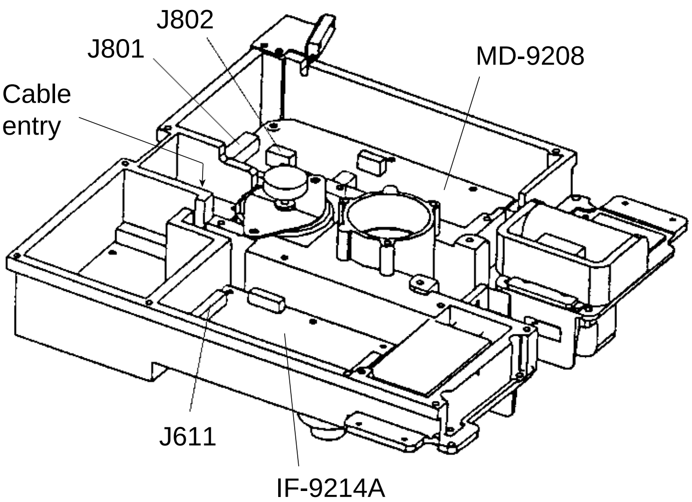
7. Pass the cable through the hole at the bottom of the radome base.
8. Secure the cable with the cable clamping plate and gasket. Ground the shield wire by

one of the screws of the cable clamping plate.

9. Attach three connectors of the signal cable to respective receptacles as shown below.

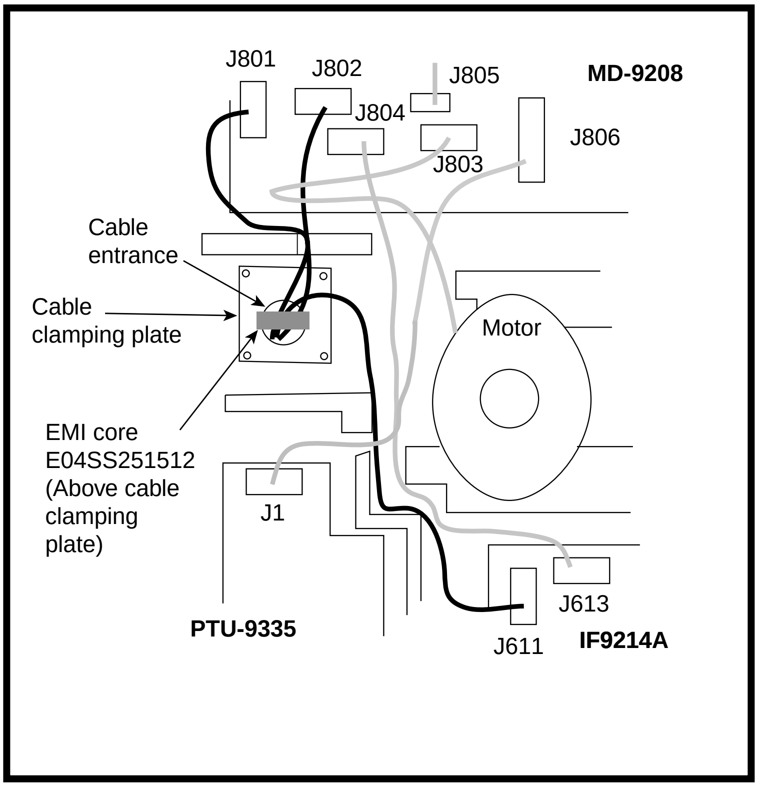


Signal cable, antenna unit side



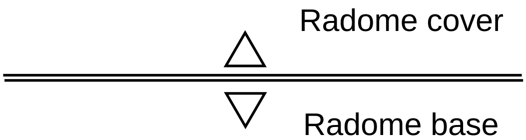
RF unit

10. Attach the EMI core supplied as shown below.



How to attach EMI core

11. Fix the shield cover. Do not pinch the cable.
12. Attach the radome cover, aligning triangle mark on radome cover with that on radome base.



How to position the radome cover

13. Loosely fasten the radome fixing bolts. You will tighten them after confirming magnetron heater voltage.

Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit for the MODEL1833C-BB to a mast on a sailboat is optionally available.

Mounting bracket 1

Type: OP03-92
Code No.: 008-445-070

Table 1-1 Mounting bracket contents

	Type	Code No.	Qty
Hex. bolt	M4X12	000-804-725	4
Hex. bolt	M8X20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-018-9002-1	100-206-751	1
Bracket (2)	03-018-9003-1	100-206-761	1
Fixing plate	03-018-9004-1	100-206-771	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket. For details, see the figure on page 1-12.

1.5 Mounting the Antenna Unit of MODEL1933C-BB/1943C-BB/1953C-BB

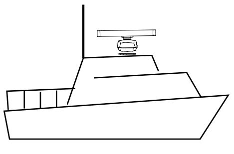
Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the antenna unit where there is a good all-round view. Any obstruction will cause shadow and blind sectors. A mast for instance, with a diameter considerably less than the width of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the antenna unit would be a much more serious obstruction; you would need to place the antenna unit well above or below it.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also avoid running the cable in parallel with power cables.
- A magnetic compass will be affected if the antenna unit is placed too close to the magnetic compass. Observe the following compass safe distances to prevent deviation of a magnetic compass: Standard compass, 1.00 m, Steering compass, 0.80 m (1953C-BB: 0.75 m).
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.

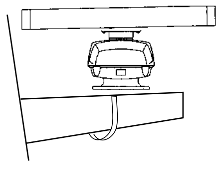
  a) When this radar is to be installed on larger vessels, consider the following points:
  The signal cable run between the antenna and the processor units comes in lengths of 10 m, 15 m, 20 m and 30 m.

  b) Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.

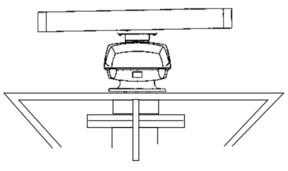
As shown in the figure below, the antenna unit may be installed on the bridge, on a common mast or on the radar mast.



(a) On bridge



(b) Common mast



(c) Radar mast

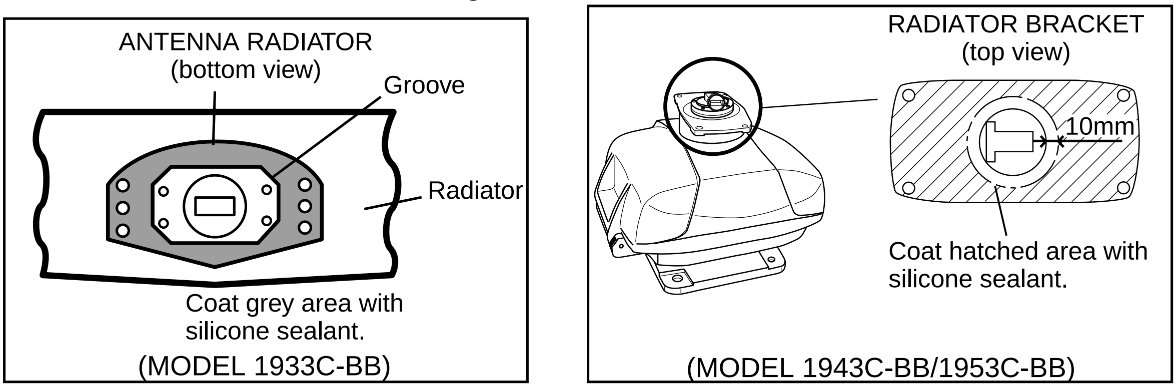
Mounting the antenna unit of MODEL1933C-BB/1943C-BB/1953C-BB

Referring to the outline drawing at the back of this manual, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the antenna unit and one hole of 25-30 mm diameter for the signal cable.

Fastening the radiator to the radiator bracket

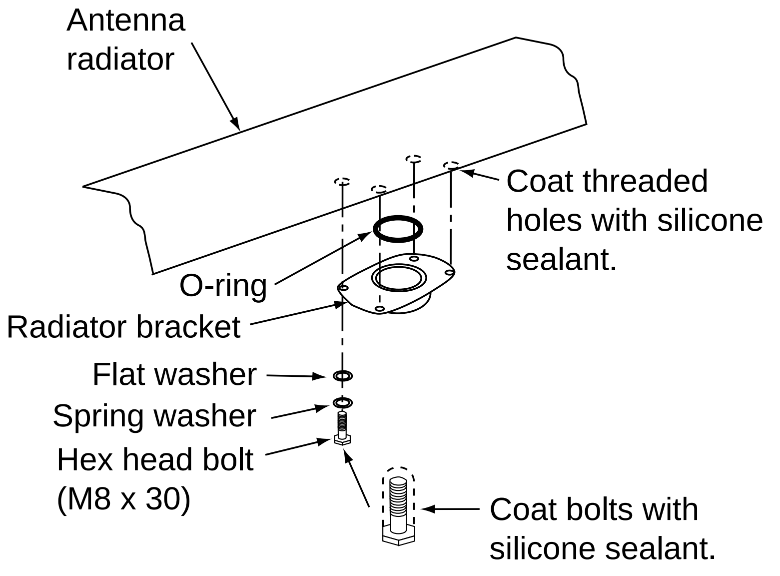
For your reference, the antenna installation materials list appears in the packing lists at the back of this manual (see page A-2 to A-3).

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between the antenna radiator and the radiator bracket with silicone sealant as shown in the figure below.



Coating the antenna with silicone sealant

3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the antenna radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.



Fastening the radiator bracket to the antenna unit chassis

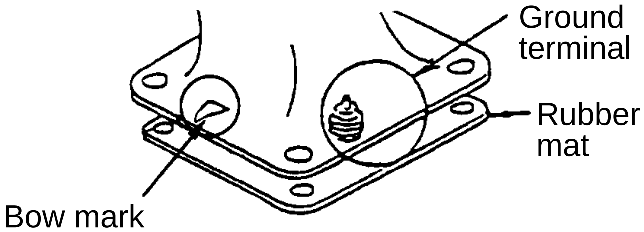
Mounting the antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200 x 200 mm) or inside (140 x 150 mm) the antenna unit.

Using outside fixing holes of the antenna housing

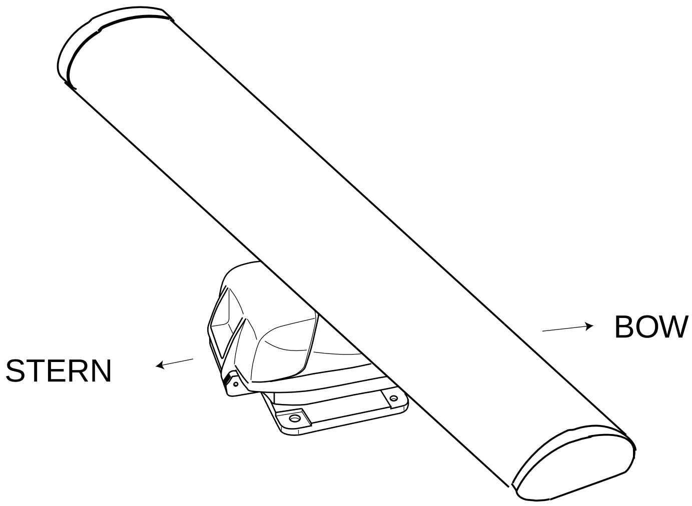
Use the hex head bolts (supplied) to mount the antenna unit as below.

1. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.



Location of rubber mat

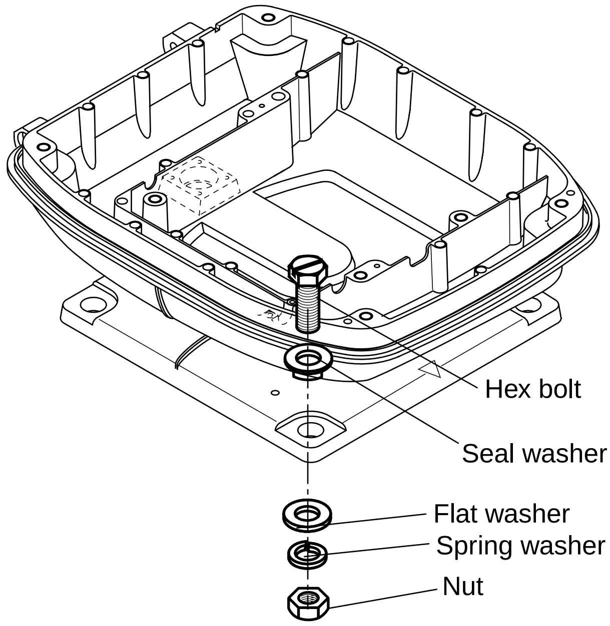
2. Lay the antenna unit on the mounting platform, orienting it as shown in below.



Antenna unit

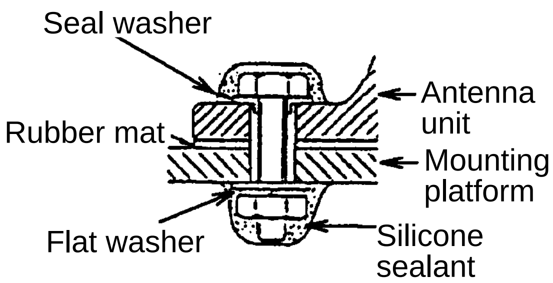
⚠ CAUTION
Do not lift the antenna unit by the radiator; lift it by the housing. Lifting it by radiator will damage the radiator.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing, as shown below.



Fixing the antenna unit chassis

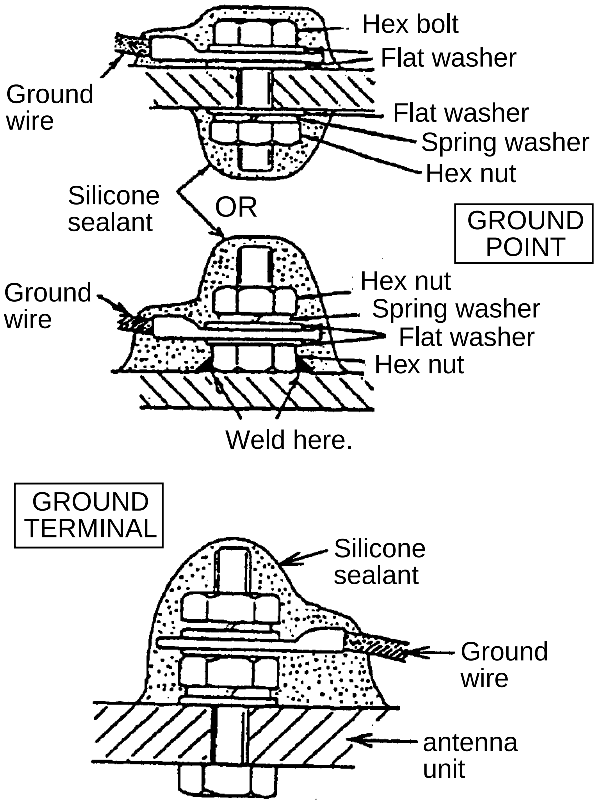
4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.



How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point in mounting platform (within 300 mm of ground terminal on antenna unit) using M6 x 25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.

8. Coat ground terminal and ground point with silicone sealant as shown below.

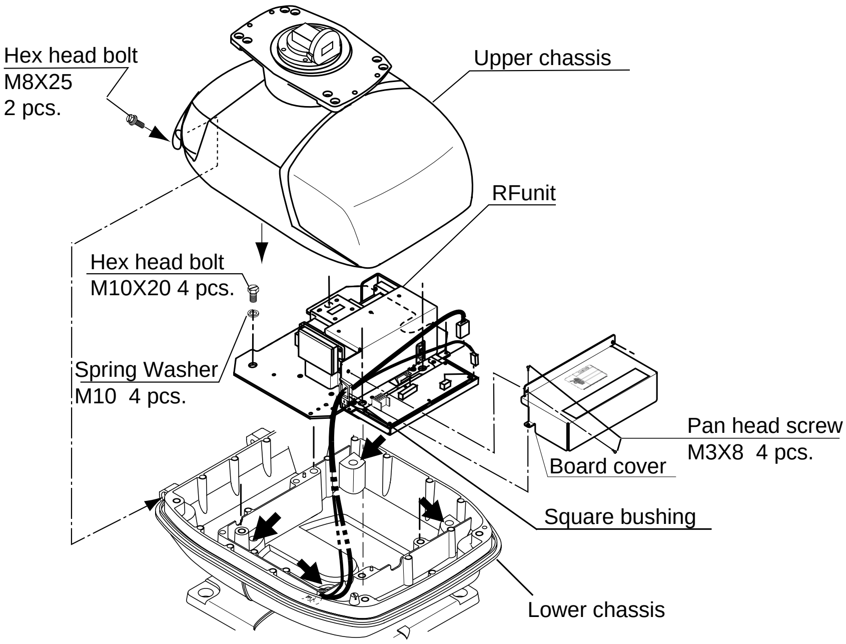


How to coat ground point and ground terminal with silicone sealant

Using inside fixing holes of the antenna housing

This method requires removal of the RF unit in the antenna unit to access inside fixing holes. Use hex head bolts, flat washers, spring washers and nuts (local supply) to mount the antenna unit, confirming length of bolts.

1. Unfasten four scanner bolts on the cover to open the antenna unit.
2. Unplug connector connected between upper and lower chassis.
3. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
4. Remove the board cover by unfastening four pan head screws.
5. Remove connector from RF unit.
6. Remove RF unit by unfastening four hex head bolts.



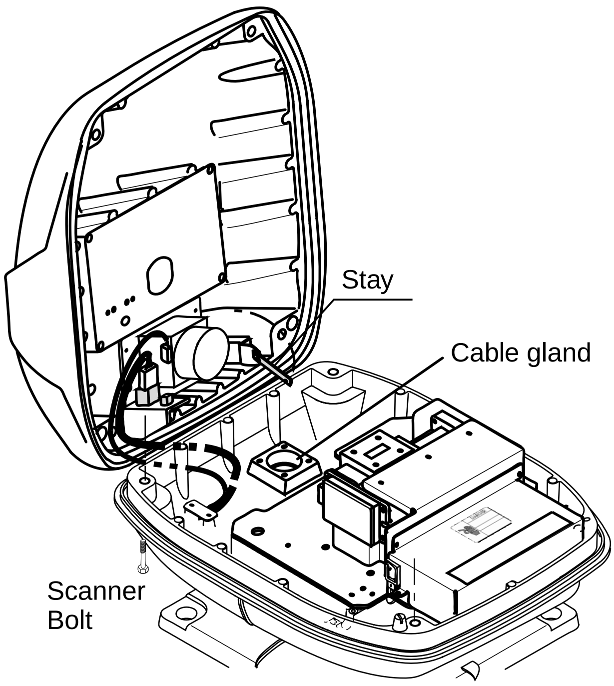
Antenna unit chassis, upper chassis separated

7. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
8. Fasten the lower chassis to the mounting platform with hex head bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in the rubber bushing and insert bolt into the bushing. Do not use seal washers.
9. Reassemble RF unit, cover and chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in “Outside fixing holes”.

Connecting the signal cable

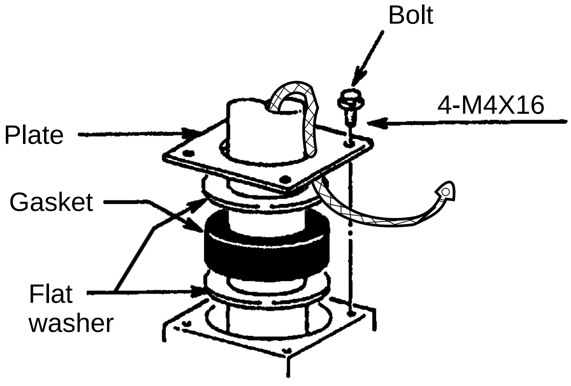
Only the signal cable runs from the processor unit (1953C-BB: power supply unit) to the antenna unit. In order to minimize the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also, avoid running the cable in parallel with power cables. Pass the cable through the hole and apply sealing compound around the hole for waterproofing.

1. Open the antenna cover by loosening four scanner bolts, and then fix the stay.



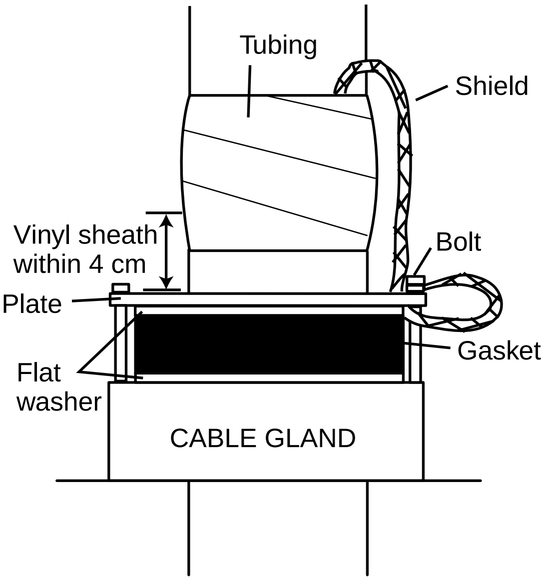
Antenna unit chassis, cover opened

2. Unfasten the cable gland assembly (plate, gasket, flat washer).
3. Pass the signal cable with connector through the bottom of the antenna unit chassis. Pass the cable through the gland assembly as shown below.



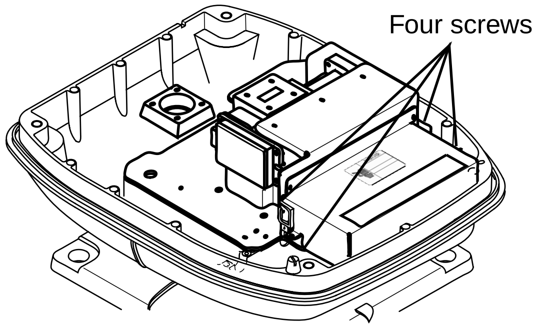
Passing the signal cable through the cable gland assembly

4. Fasten the crimp-on lug on the shield to one of the fixing bolts of the cable gland assembly.
5. Position the signal cable so that no more than 4 cm of the sheath is exposed as shown in the figure at the top of the next page. Tighten fixing bolts.



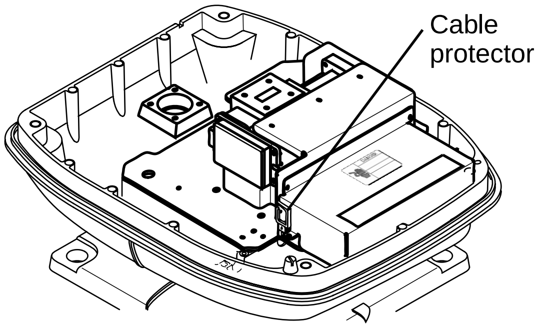
How to fix signal cable in cable gland

6. Unfasten four screws shown in the figure below.



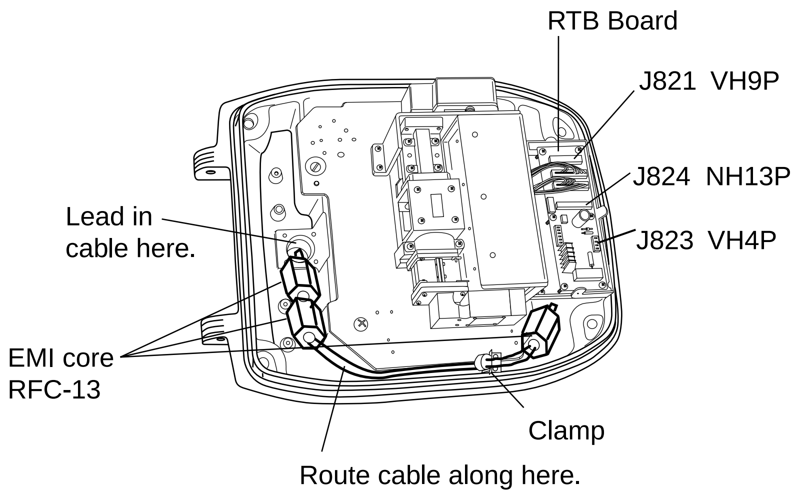
Antenna unit chassis, cover opened

7. Pass the signal cable through the cable protector.



Antenna unit chassis, cover opened

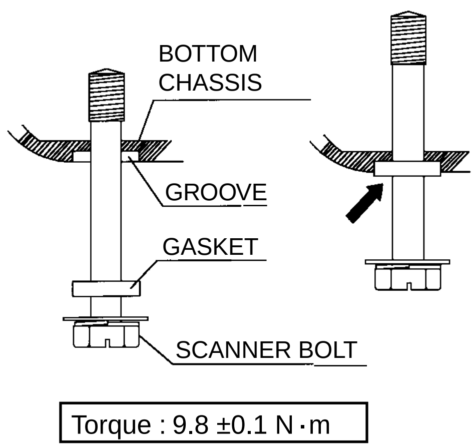
8. Connect the signal cable to the RTB Board (03P9249 or 03P9250), referring to the interconnection diagram and the figure below.
9. Attach three EMI cores to the signal cable as shown below.



Antenna unit chassis, cover opened

10. Fix the signal cable with the cable clamp.
11. Release the stay and close the cover. Loosely fasten the scanner bolts; you will have to make some adjustments inside after completion of wiring.

Note: When closing the cover, set the gaskets to grooves in the bottom chassis, then tighten bolts.

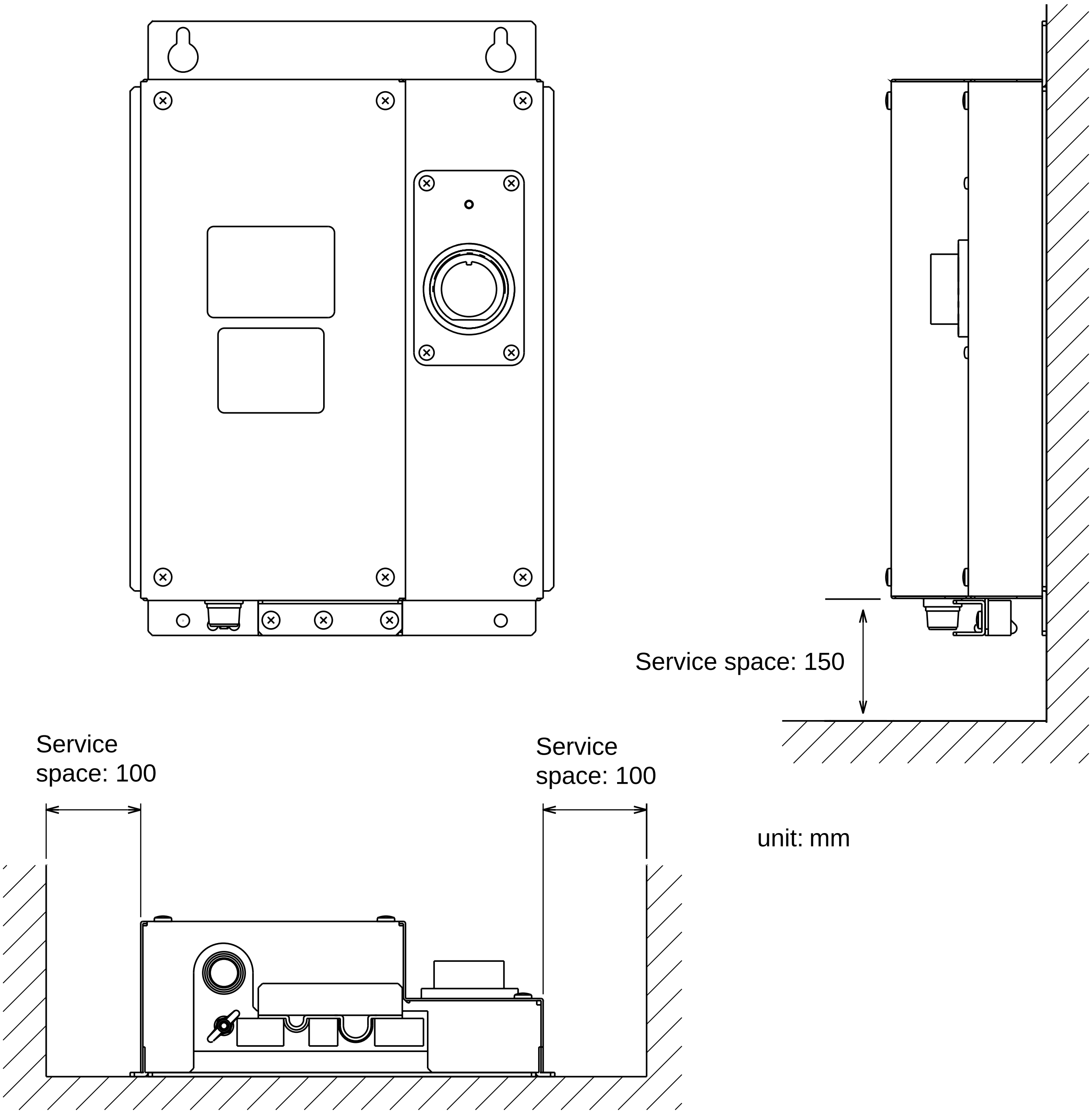


1.6 Mounting the Power Supply Unit of MODEL1953C-BB

A power supply unit is shipped with the M1953C-BB, because of its high power consumption.

The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided and is installed within 5 m (cable length) from the processor unit.

Note: Do not install the power supply unit on the overhead; install it on the deck or bulkhead.



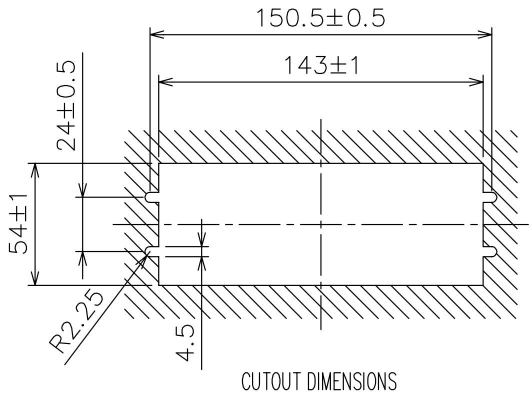
Power supply unit

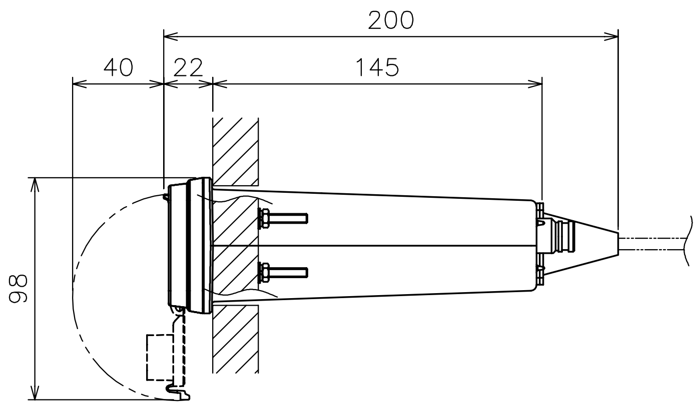
1.7 Mounting the Memory Card Interface Unit

Flush mounting

This unit can be flush-mounted in a panel with the standard installation materials.

1. Prepare a cutout in the mounting location, referring to the outline drawing at the end of this manual.
2. Screw in the threaded rods to the flange of the front panel of the unit securely by hands.
3. Set the unit to the cutout.
4. Insert the flat washer, spring washer and nut in that order for each rod and fasten the nuts.





Flush mounting

Desktop mount

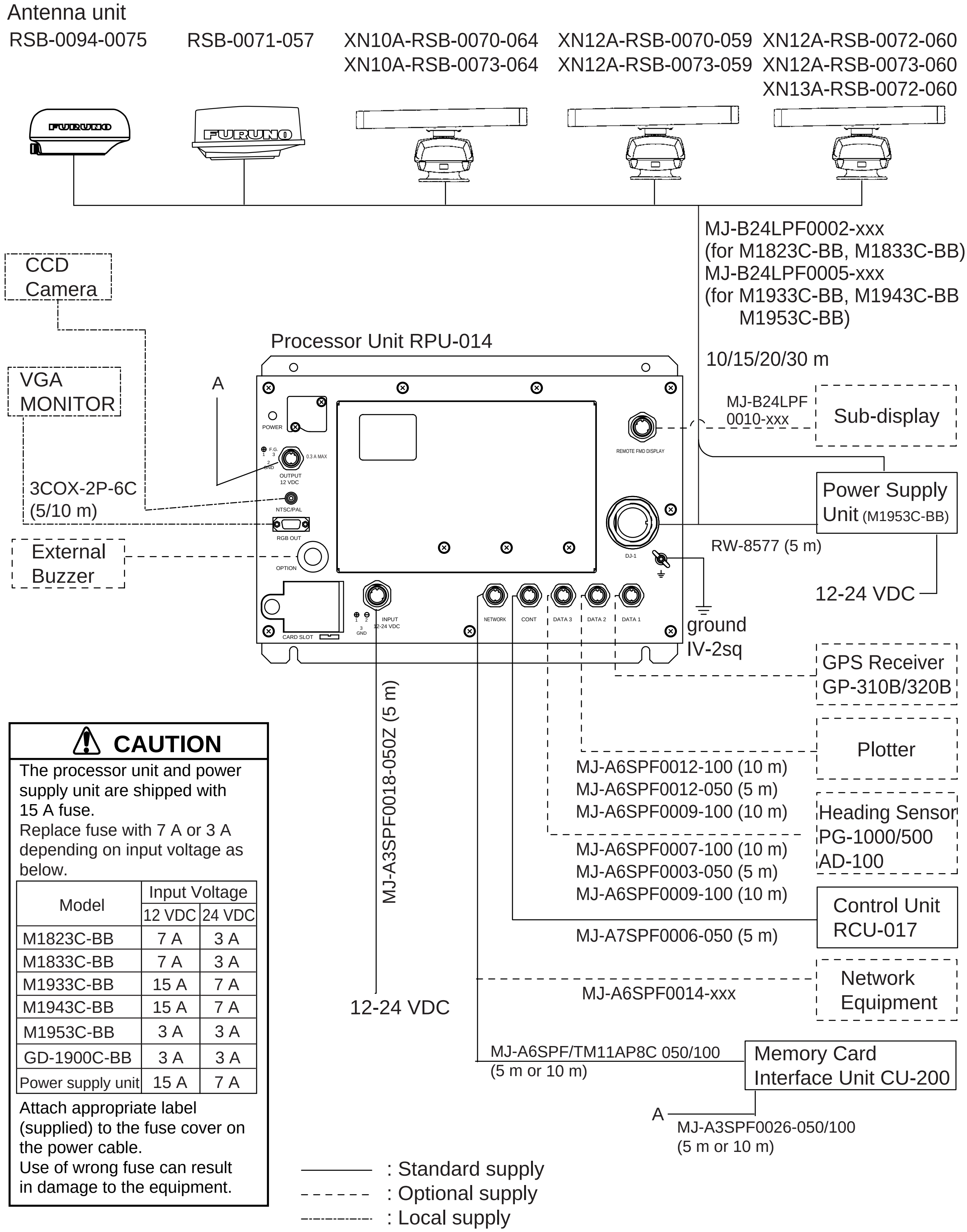
For desktop mount, the optional desktop mount kit FP03-10201 is required. Refer to the end of this manual.

1. Put the mounting bracket 19-023-3081 on the unit.
2. Fix the mounting bracket to the unit with four screws.
3. Mount the above assembly on a desktop with four tapping screws.

2. WIRING

2.1 Standard Wiring

All wirings are terminated at the rear of the processor unit.



⚠ CAUTION

The processor unit and power supply unit are shipped with 15 A fuse.
Replace fuse with 7 A or 3 A depending on input voltage as below.

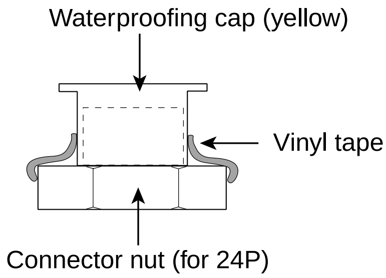
Model	Input Voltage	
	12 VDC	24 VDC
M1823C-BB	7 A	3 A
M1833C-BB	7 A	3 A
M1933C-BB	15 A	7 A
M1943C-BB	15 A	7 A
M1953C-BB	3 A	3 A
GD-1900C-BB	3 A	3 A
Power supply unit	15 A	7 A

Attach appropriate label (supplied) to the fuse cover on the power cable.
Use of wrong fuse can result in damage to the equipment.

DJ-1

For MODEL1823C-BB/1833C-BB/1933C-BB/1943C-BB/1953C-BB, remove the waterproofing cap from the DJ-1 port on the processor unit and discard it.

GD-1900C-BB: Do not remove the waterproofing cap. Wrap the connector nut and cap with vinyl tape as shown below.



Waterproofing cap and connector nut, sectional view

DATA1 to DATA3

Other equipment can be connected to DATA1-DATA3 as shown below.

DATA1 (7P)	DATA2 (6P)	DATA3 (6P)
GPS receiver GP-310B/320B	NMEA sentence (ex. navaid)	Heading sensor (ex. SC-60/120) (MODEL series only)

This equipment can receive the following NMEA 0183 format sentence from external equipment.

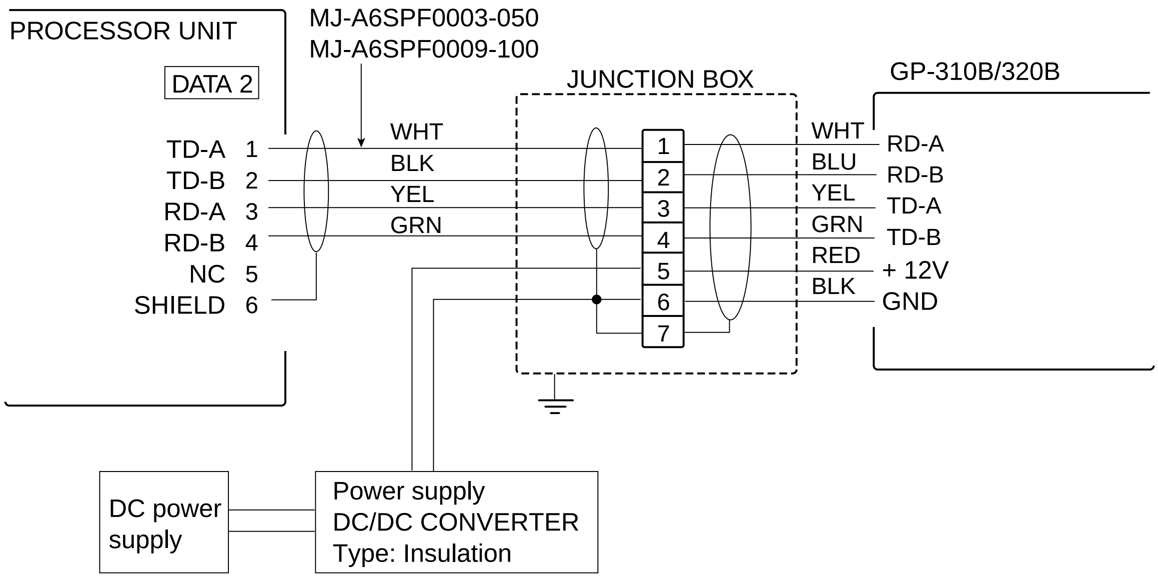
- Own ship's position: GGA>RMC>RMA>GLL
- Ship's speed: RMC>RMA>VTG>VHW
- Satellites in view: GSV
- Heading (True): HDT>HDG>HDM
- Heading (Magnetic): HDT>HDG>HDM
- Course: RMC>RMA>VTG
- Depth: DPT>DBT
- Temperature: MTW
- Time: ZDA
- Other ship's information: TTM
- Wind speed and angle: HWV>VWT>VWR

You will need the optional NMEA cable to connect with other equipment (E/S, navaid, etc.).

Connecting GP-310B/320B to DATA 2 port

GPS receiver GP-310B/320B can be connected to DATA 2 port as shown below when port 1 is not available.

You need a junction box and optional cable MJ-A6SPF0003-050 or MJ-A6SPF0009-100.



Connecting GP-310B/320B to DATA 2 port

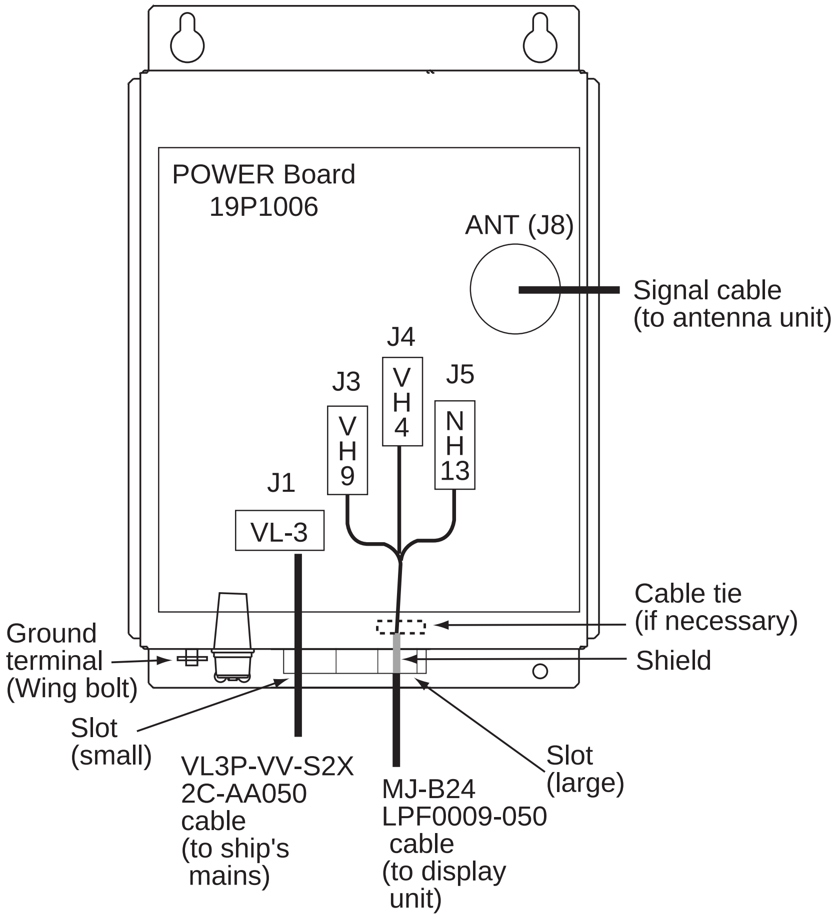
NETWORK port

Other NavNet equipment should be connected to the NETWORK port, with the optional cable MJ-A6SPF0014. Available equipment are shown below.

Radar	Plotter	Network sounder	Other
MODEL1823C-BB/ 1833C-BB/1933C-BB/ 1943C-BB/1953C-BB or other type of FURUNO NavNet radar.	GD-1900C-BB	ETR-6/10N ETR-30N	Facsimile receiver FAX-30 HUB (Used when more than two NavNet units are connected.)

2.2 Wiring of Power Supply Unit (MODEL1953C-BB only)

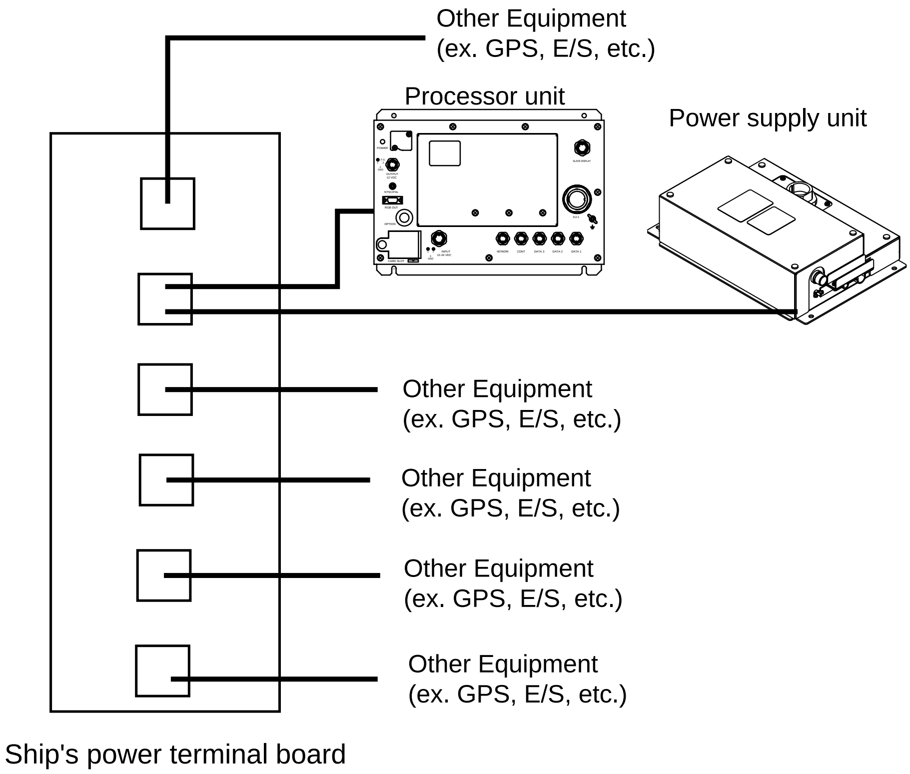
1. Loosen three M4 screws to remove the cable clamp of the power supply unit PSU-005.
2. Loosen six M4 screws to remove the unit cover.
3. Attach the VL connector of power supply cable VL3P-VV-S2X2C-AA050 (supplied as installation material) to J1 on the POWER Board.
4. Attach the VH and NH connectors of MJ-B24LPF0009-050 cable (supplied as installation material) to the appropriate locations; VH9: J3, VH4: J4, NH13: J5.



Power supply unit, cover removed

5. Lay two cables on the slots referring to the figure above.
6. Reattach the unit cover (removed at step 2).
7. Reattach the cable clamp (removed at step 1) to fix the two cables.
8. Connect the antenna cable to the ANT port on the power supply unit.
9. Connect the ground wire (local supply, IV-2sq) between the ground terminal and ship’s ground.

Note: The power for the power supply unit and processor unit must be drawn from the same power switch on the ship's power terminal board.



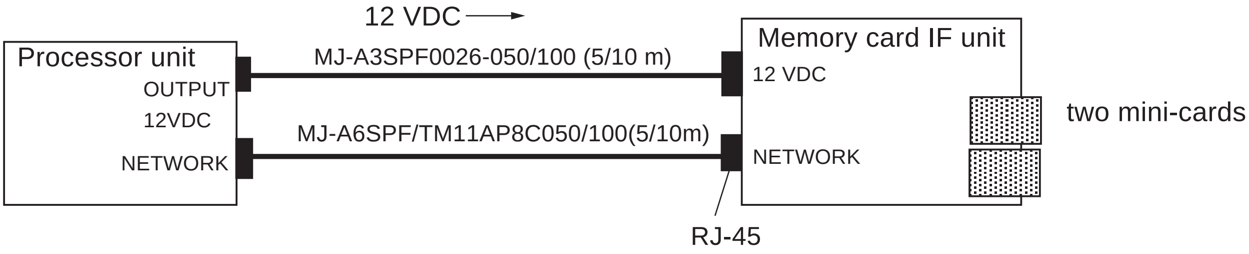
Replacement of the fuse

The power supply unit is shipped with a 15 A fuse. Replace the 15 A fuse with a 7 A fuse (supplied) when the ship's battery is 24 VDC. The fuse in the processor unit is also 15 A. Replace it with a 3A fuse.

2.3 Connection of CU-200

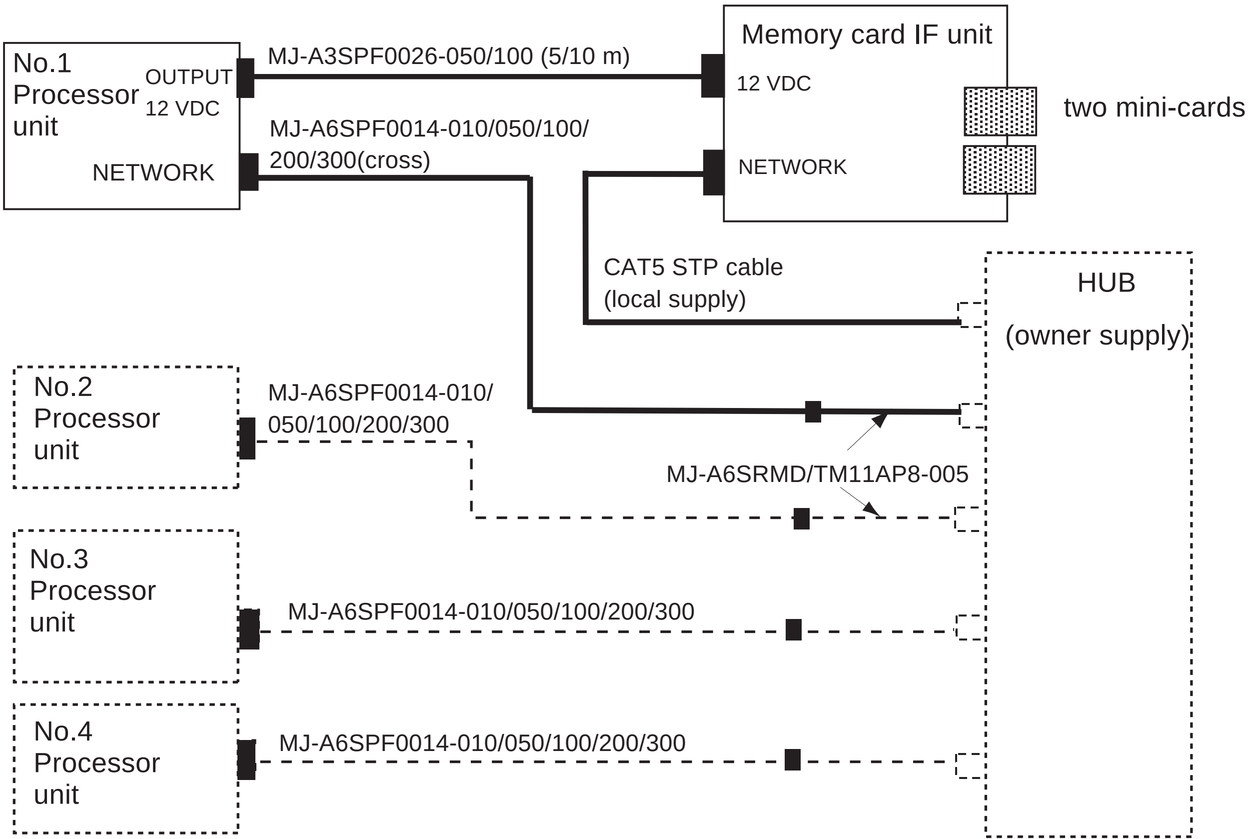
1) Connection between one processor unit and one memory card IF unit

Connect as shown in the figure below.



2) Connection between one memory card IF unit and multiple processor units

Prepare optional cable MJ-A6SPF0014-010/050/100/200/300 (1, 5, 10, 20 or 30 m), and procure HUB and CAT5 STP cable locally. Connect as shown in the figure below.

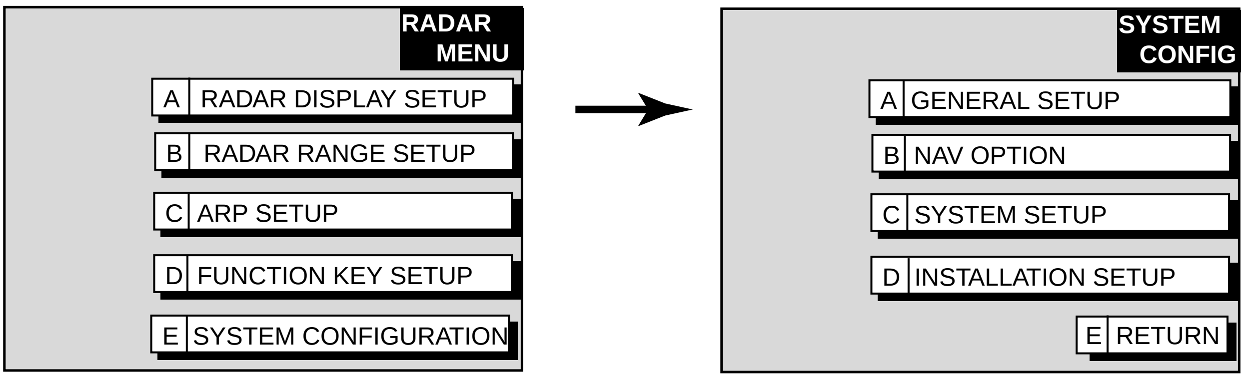


3. ADJUSTMENT

3.1 How to Access the Installation Menu

Set up the equipment through the installation menu after completing the installation. To access the installation menu, follow the steps below.

1. With the display powered off, hold down the [MENU] key. Then, momentarily press the [POWER/TX] key while continuing to hold the [MENU] key down. You may release the [MENU] key when a blue start-up screen appears.
2. Release the [MENU] key when the message “STARTING INSTALLATION MODE” appears.
3. After the radar screen appears, press the [MENU] key to show the RADAR MENU.
4. Press the E: SYSTEM CONFIGURATION soft key to show the SYSTEM CONFIG menu.

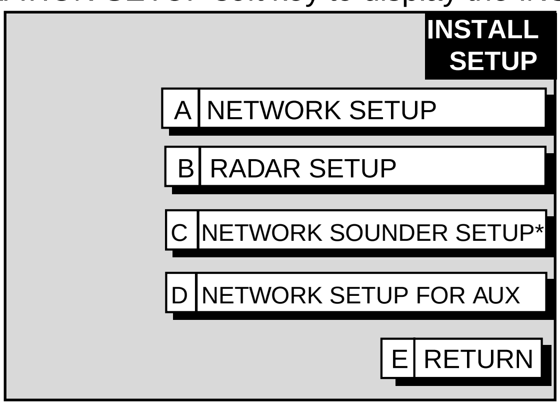


Radar menu
(Ex. MODEL1823C-BB/1833C-BB/1933C-BB/1943C-BB/1953C-BB)

System configuration menu

How to access the Installation menu

5. Press the D: INSTALLATION SETUP soft key to display the INSTALL SETUP menu.



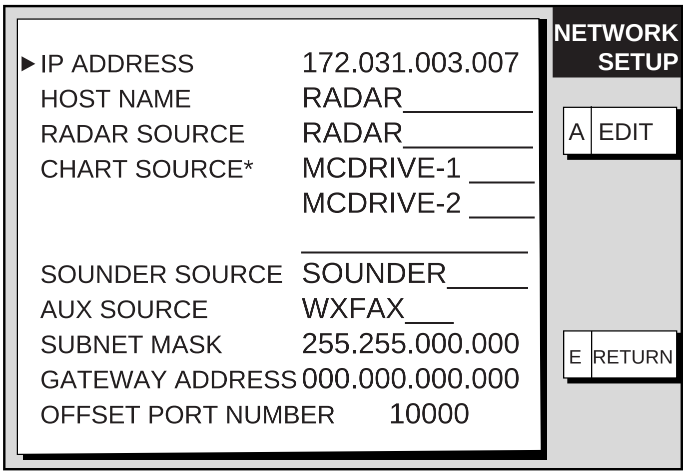
*: Do not change adjust items in this menu.

Installation setup menu

3.2 NETWORK SETUP Menu

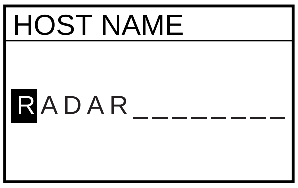
Set up the NavNet network to communicate with other NavNet equipment.

1. Open the INSTALL SETUP menu.
2. Press the A: NETWORK SETUP soft key.



Network setup menu

3. Select menu option and press the A: EDIT soft key or [ENTER] knob. For example, select HOST NAME.



Host name window

4. Use the trackball to select location and press the alphanumeric keys to set character (or value).
5. Press the [ENTER] knob or C: ENTER soft key to finish.
6. Repeat steps 3-5 to enter other items, referring to the table on the next page.
7. Press the [MENU] key to finish.

*: The default setting for card drivers is as follows:

- Slot on the processor unit: Read only
- Left slot on the CU-200: Read only
- Right slot on the CU-200: Read and Write

For the CHART SOURCE setting, the card drive 1 or 2 on the CU-200 can be selected by the soft key "A:1/2." "-1" or "-2" is also displayed for other device (for example, RADAR-1 or PLOTTER-1), but these numbers may be ignored.

Contents of Network setup menu

Item	Description	Default Setting
IP ADDRESS	This address is assigned at the factory. Change the address (last three digits; 001 to 254) when like models are connected directly or through the hub. Do this change before connecting the equipment to the other equipment or hub in order to distinguish equipment. Do not set the same IP address in the network.	Radar: 172.031.003.007
HOST NAME	Set the name for radar or plotter to distinguish it from others in the NavNet system. Confirm that no two equipment have same host names. The host name has been preset depending on the series of NavNet. See the table below. This host name is used for RADAR SOURCE and CHART SOURCE.	MODEL series: RADAR GD-1900C-BB: PLOTTER
RADAR SOURCE	Enter the host name “RADAR (preset)” or the new name set at HOST NAME if the unit has been changed of the network radar to use for the radar display. Clear the RADAR SOURCE name when your equipment is GD-1900C-BB and no radar is connected.	RADAR
CHART SOURCE	The driver names of the memory card interface unit are MCDRIVE-1 (left side) and MCDRIVE-2 (right side). Additionally, enter a host name (set at HOST NAME) of network display unit (max. 3) which can read chart cards.	MCDRIVE
SOUNDER SOURCE	The host name of the network sounder ETR-6/10N or ETR-30N is preset (SOUNDER) for use with the video sounder display. Clear the host name when no network sounder is connected.	SOUNDER
AUX SOURCE	For the facsimile receiver FAX-30. Use the default setting.	WX FAX
SUBNET MASK	Not used. Reserved for future use.	255.255.000.000
GATEWAY ADDRESS		000.000.000.000
OFFSET PORT NUMBER		10000

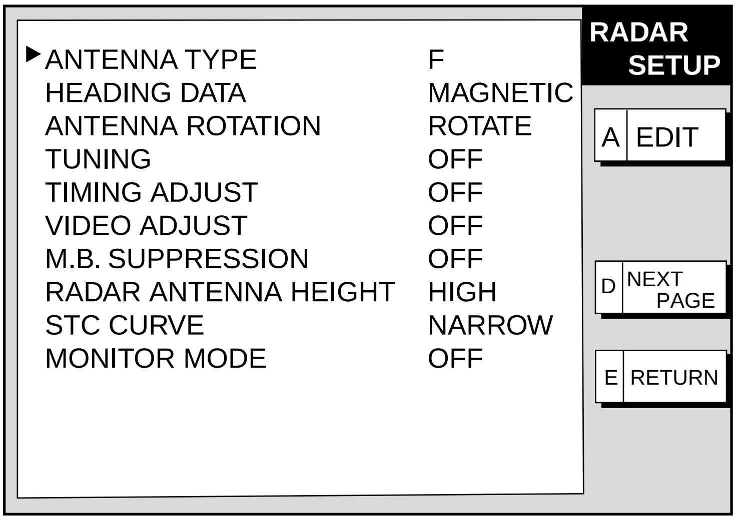
NavNet equipment default settings

Model	IP ADDRESS	HOST NAME
MODEL1823C-BB/1833C-BB/1933C-BB/ 1943C-BB/1953C-BB, GD-1900C-BB	172.031.003.007	RADAR, PLOTTER
MODEL1823C/1833C/1933C/ 1943C/1953C, GD-1900C	172.031.003.003	RADAR, PLOTTER
MODEL1833/1933/1943	172.031.003.002	RADAR
MODEL1722C/1732C/1742C/1762C/1752C	172.031.003.001	RADAR
MODEL1722/1732/1742/1762	172.031.003.004	RADAR
GD-1700/1700C	172.031.014.001	PLOTTER
CU-200	172.031.014.100	MCDRIVE

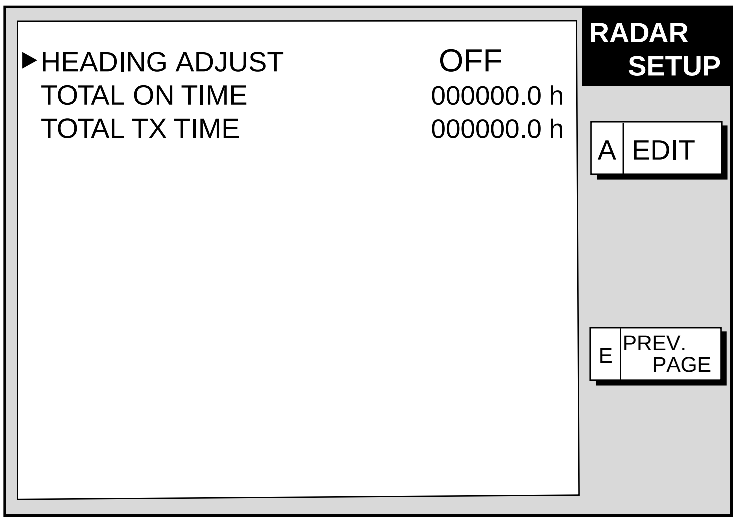
3.3 RADAR SETUP Menu

After setting up the network, do the following in order to adjust the radar.

Open the INSTALL SETUP menu, and then press the B: RADAR SETUP soft key to display the RADAR SETUP menu. When the message “RADAR DOES NOT TRANSMIT. TRANSMIT RADAR?” appears, press the [ENTER] knob to transmit or [CLEAR] key to cancel transmitting.



Page 1



Page 2

Radar setup menu

ANTENNA TYPE

Select the antenna type connected to your display unit. Default setting is “F”.
Select the antenna type referring to the table shown below.
After selecting type, press the [ENTER] knob.

Your unit	Setting
MODEL1823C-BB	A
MODEL1833C-BB	B
MODEL1933C-BB	F
MODEL1943C-BB	G
MODEL1953C-BB	H

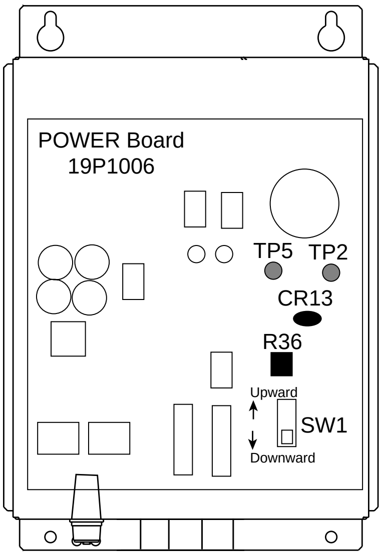
TUNING

MODEL 1953C-BB: Go to “Tuning for 1953C-BB power supply unit”, and then “Antenna tuning”.
Other models: Go to “Antenna tuning”.

Tuning for 1953C-BB power supply unit

For MODEL1953C-BB, first tune the power supply unit to adjust the tuning point of the tuning indicator.

1. Open the power supply unit cover.
2. On the RADAR SETUP menu, select STOP at ANTENNA ROTATION.
3. Close the menu, and then transmit the radar with the range more than 6 nm.
4. Flip the SW1 on the POWER Board upward (for tuning position).
5. Adjust R36 potentiometer clockwise so that LED CR13 lights in the highest brilliance. Also connect a multimeter to TP5 (+) and TP (-), and then adjust R36, to show maximum voltage on the multimeter.
6. Flip the SW1 downward (normal position, default setting).
7. Reassemble the power supply unit.
8. Go to “Antenna tuning” on the next page.

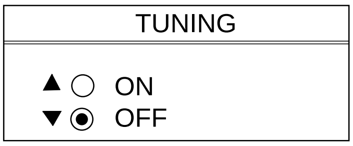


Power supply unit, cover removed

Antenna tuning

Initialize the tuning as follows.

1. Transmit the radar.
2. Open the RADAR SETUP menu, and then select TUNING by the trackball or [ENTER] knob.
3. Press the A: EDIT soft key to show the setting window.



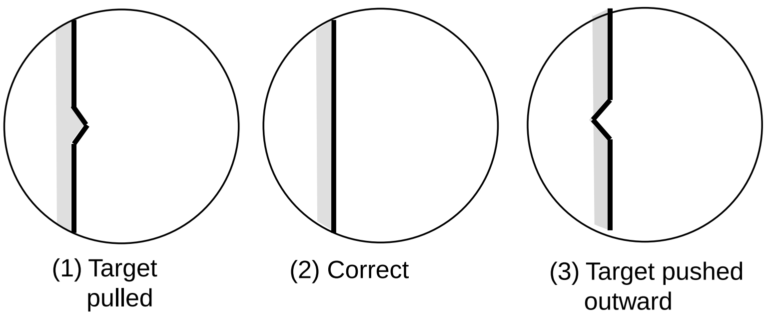
Tuning setup menu

4. Select ON.
5. Press the [ENTER] knob or C: ENTER soft key to start the auto tuning. After the adjustment is completed, the message “NOW TUNING” disappears and control returns to the menu screen automatically.

TIMING ADJUSTMENT

This adjustment ensures proper radar performance, especially on short ranges. The radar measures the time required for a transmitted echo to travel to the target and return to the source. The received echo appears on the display based on this time. Thus, at the instant the transmitter is fired, the sweep should start from the center of the display (sometimes called sweep origin.)

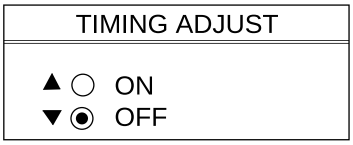
A trigger pulse generated in the processor unit goes to the antenna unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the antenna unit varies, depending largely on the length of signal cable. During this period the processor unit should wait before starting the sweep. When the processor unit is not adjusted correctly, the echoes from a straight local object (for example, a harbor wall or straight pier) will not appear with straight edges – namely, they will be seen as “pushed out” or “pulled in” near the picture center. The range of objects will also be incorrectly shown.



Examples of improper and correct sweep timing

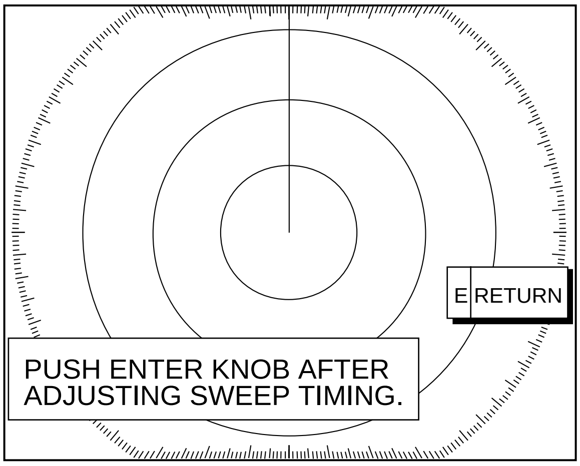
1. Transmit on the shortest range and confirm that gain and A/C SEA are properly adjusted.
2. Visually select a target which forms a straight line (harbor wall, straight piers).
3. Open the RADAR SETUP menu and select TIMING ADJUST.

4. Press the A: EDIT soft key to show the setting window.



Timing adjust setting menu

5. Select ON and press the C: ENTER soft key to show the radar display.



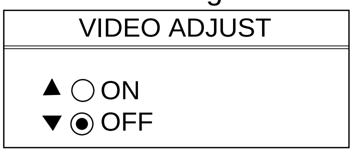
Timing adjustment setting display

6. Rotate the [ENTER] knob to straighten the target selected at step 2, and then press the E: RETURN soft key to finish.

VIDEO ADJUSTMENT

Adjust video amplifier input level as below.

1. Open the RADAR SETUP menu and select VIDEO ADJUST by the trackball.
2. Press the A: EDIT soft key to show the setting window.



Video adjustment setting window

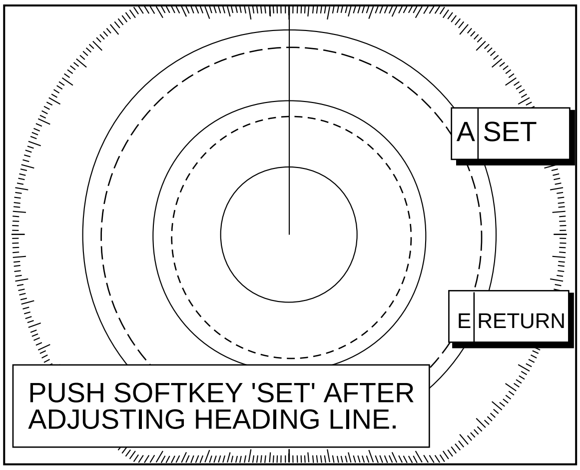
3. Select ON.
4. Press the C: ENTER soft key to start video adjustment.
5. When the adjustment is completed, the message “NOW ADJUSTING VIDEO” disappears, and control returns to the menu screen automatically.

HEADING ADJUSTMENT

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.

1. Set ship's heading toward a suitable target (for example, ship or buoy) at a range between 0.125 and 0.25 nautical mile.
2. Open the RADAR SETUP menu, and press the D: NEXT PAGE soft key.
3. Select HEADING ADJUST and press the A: EDIT soft key to show the HEADING ADJUST window.
4. Select ON followed by the C: ENTER soft key to show the radar display.



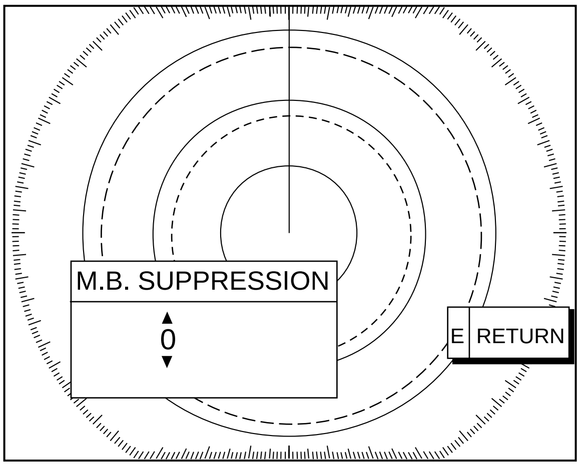
Heading adjustment setting display

5. Rotate the [ENTER] knob to bisect the target with the EBL.
6. Press the A: SET soft key.
7. As a final test, move the boat towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

M. B. (Main Bang) SUPPRESSION

Main bang (black hole), which appears at the display center on short ranges, can suppressed as follows.

1. Open the RADAR SETUP menu and select M.B. SUPPRESSION by trackball.
2. Press the A: EDIT soft key to show the setting window.
3. Select ON.
4. Press the C: ENTER soft key to start the adjustment.



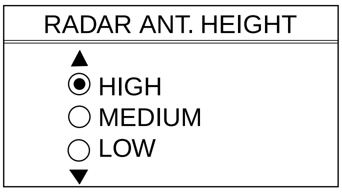
Main bung suppression setting window

5. Rotate the [ENTER] knob to suppress main bang (between 0 and 25).
6. Press the E: RETURN soft key.

RADAR ANTENNA HEIGHT

The A/C SEA function changes with respects to antenna height above the waterline. Set antenna height above the waterline to optimize the A/C SEA function.

1. Open the RADAR SETUP menu and select RADAR ANTENNA HEIGHT.
2. Press the A: EDIT soft key to show the setting window.



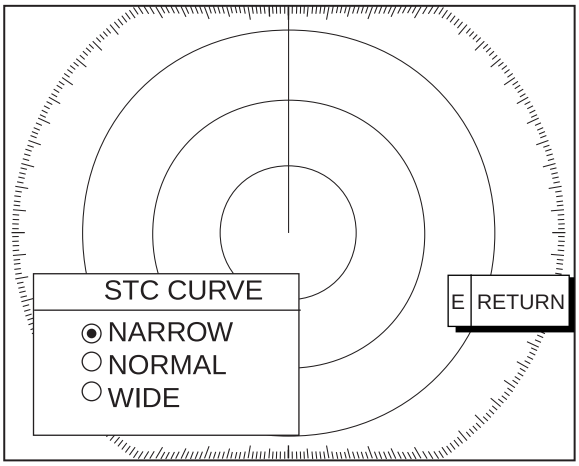
Radar antenna height setting window

3. Select antenna height above the waterline; HIGH (6-10 m), MEDIUM (3-6 m) or LOW (0-3 m). The default setting is MEDIUM.
4. Press the C: ENTER soft key to finish.

STC CURVE

The default STC curve can be maintained in most cases. If necessary the STC curve can be changed as follows:

1. Open the RADAR SETUP menu and select STC CURVE.
2. Press the A: EDIT soft key to show the setting window.



STC curve setting window

3. Select STC curve;

   NARROW: The effective range of the [A/C SEA] adjustment is relatively short.

   NORMAL: Between NARROW and WIDE.

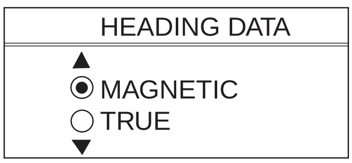
   WIDE: The effective range of the [A/C SEA] adjustment is relatively long.
4. Press the E: RETURN soft key to finish.

HEADING DATA

Select the heading reference, MAGNETIC or TRUE. Select MAGNETIC when connecting with a magnetic compass, or select TRUE when connecting with a true heading compass. For your reference, when connecting with the FURUNO Satellite Compass SC-60/120 or Integrated Heading Sensor PG-1000, set the heading data as in the table shown below.

Model		Setting of HEADING DATA
PG-1000	with L/L data	TRUE
	w/o L/L data	MAGNETIC
SC-60/120		TRUE

1. Open the RADAR SETUP menu and then select HEADING DATA.
2. Press the A: EDIT soft key to show the setting window.



Heading data setting window

3. Select MAGNETIC or TRUE.
4. Press the C: ENTER soft key.

3.4 Checking Magnetron Heater Voltage

Note: This confirmation/adjustment should only be performed by a qualified service technician.

Magnetron heater voltage is formed on the PTU (1833C-BB)/MD (1823C-BB/1933C-BB/ 1943C-BB/1953C-BB) Board of the antenna unit, and preadjusted at the factory. Therefore no adjustment is required. However, check magnetron heater voltage for confirmation as follows:

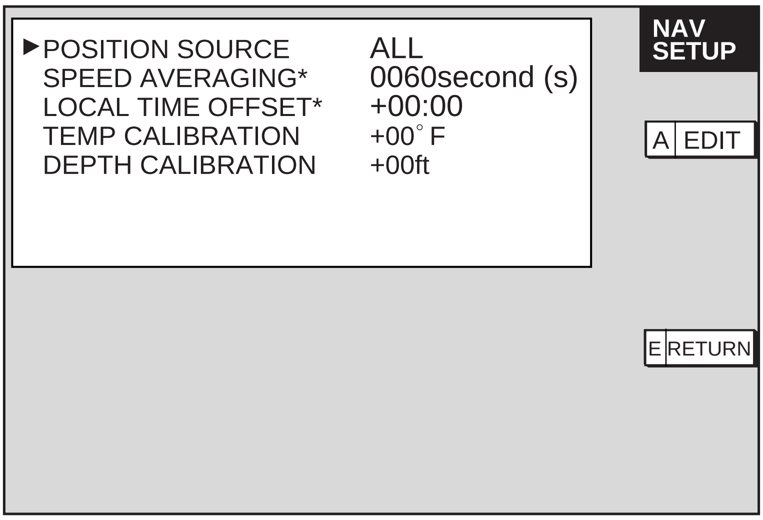
1. Open the antenna unit.
2. Turn on the power. Do not transmit the radar.
3. Connect a multimeter, set to 10 VDC range, on the MD (1823C-BB), PTU (1833C-BB) or RTB (1933C-BB/1943C-BB/1953C-BB) Board in the antenna unit, referring to the table below.
4. Confirm that the multimeter indication is as shown in the table below.

	MODEL1823C-BB	**MODEL1833C-BB**	**MODEL1933C-BB/ 1943C-BB/1953C-BB**
Check point	TP804#6 (+) and #4 (-) on MD Board	TP802#4 (+) and #6 (-) on PTU Board	J825#4 and #6 (GND) on RTB Board
Multimeter indication	7.9 to 8.1 V	7.4 to 7.6 V	7.4 to 7.6 V
Adjustment point	VR801 on MD Board	R106 on PTU Board	VR801 on MD Board

3.5 Navigation Data Source

The NAV SOURCE SETTINGS menu mainly selects the source of nav data. For navigator other than the FURUNO GP-310B/320B, speed averaging and local time offset (to use local time instead of UTC time) are also available from this menu.

1. Press the [MENU] key followed by E: SYSTEM CONFIGURATION, B: NAV OPTION and A: NAV SOURCE SETTINGS soft keys to show the NAV SETUP menu.



* For GPS receiver other than GP-310B/320B.

Nav setup menu

2. Select POSITION SOURCE and then press the A: EDIT soft key to show the position source window.

POSITION SOURCE
▲ ○ FURUNO BB GPS ○ GP ○ LC ⊙ ALL ▼

3. Select FURUNO BB GPS, GP, LC or ALL as appropriate and press the C: ENTER soft key.

   FURUNO BB GPS: GPS Receiver GP-310B/320B

   GP: GPS navigator (via NETWORK, DATA 1, or DATA2 connector)

   LC: Loran C (via NETWORK, DATA 1, or DATA 2 connector)

   ALL: Multiple navaid connection (via NETWORK, DATA 1, or DATA 2 connector)

4. **For GPS receiver other than the GP-310B/320B**, you may adjust speed averaging and use local time.
   a) Choose desired item and press the A: EDIT soft key.
   b) Use the trackball to select location and rotate the [ENTER] knob to set value. For time, use the A:+< - -> - soft key to switch from plus to minus and vice versa.
   c) Press the C: ENTER soft key.

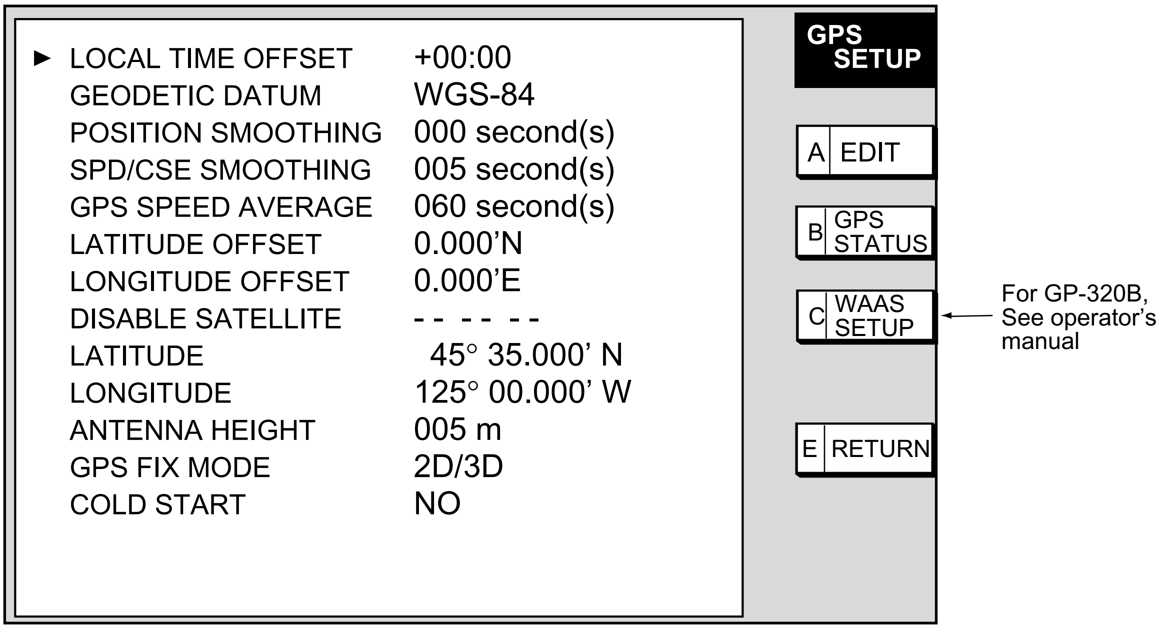
   Speed Averaging: Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting, 60 seconds, is suitable for most conditions. The range of adjustment is 0-9999 (sec).

   Local Time Offset: GPS uses UTC time. If you would rather use local time, enter the time difference between it and UTC. The range of offset is –13:30 to +13:30 and the default setting is zero (no offset). Adjustment of this setting is not necessary if the time difference has been entered at the GPS navaid connected to the NavNet.

   Temp Calibration: Offsets NMEA water temperature data (-40°F to +40°F).

   Depth Calibration: Offsets NMEA depth data (-15 ft to +90 ft).

5. **For GP-310B/320B,** press the E: RETURN soft key twice to show the SYSTEM CONFIG menu.
   a) Press the C: SYSTEM SETUP soft key followed by A: PORT SETUP and A: GPS/NMEA PORT soft keys. When the GP-310B/320B is connected to the DATA 2 port, press the B: NMEA PORT soft key.
   b) Select FURUNO GPS SENSOR, and press the A: EDIT soft key to show FURUNO GPS SENSOR window.
   c) Select YES and press the C: ENTER soft key.
   d) Press the E: RETURN soft key three times followed by B: NAV OPTIONS, B: GPS SENSOR SETTINGS soft keys to show the GPS SETUP menu.

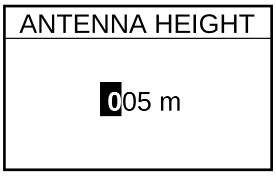


GPS setup menu

e) Select LOCAL TIME OFFSET and press the A: EDIT soft key.

f) Enter time difference between local time and UTC time. Use the A: + < - -> - soft key to switch from plus to minus and vice versa. Press the C: ENTER soft key.

g) Select ANTENNA HEIGHT and press the A: EDIT soft key.



Antenna height window

h) Enter the height of the GP-310B/320B antenna unit above sea surface. Use the trackball to select digit and press the alphanumeric keys to set value. The default height is 5 m.

i) Press the C: ENTER soft key.

j) Choose and set other items as appropriate, referring to the table on the next page.

Contents of GPS sensor settings menu

Item	Description	Settings	Default Setting
Local Time Offset	Allows the user to use local time (instead of UTC time). Enter time difference between local time and UTC time. Use the A:+ < - - > - soft key to switch from plus to minus and vice versa.	-13:30 to +13:30 hr	0 hr (no offset)
Geodetic Datum	Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing.	Use the trackball or [ENTER] knob to select appropriate chart.	WGS-84
Position Smoothing	When the DOP or receiving condition is unfavorable, the GPS fix may change, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting shows response time to change in latitude and longitude. This is especially noticeable at high ship's speeds. Increase the setting if the GPS fix changes.	0-999 sec	0 sec (no position smoothing)
Spd/Cse Smoothing	During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeroes.	0-999 sec	5 sec
GPS Speed Average	Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds, which is suitable for most conditions.	0-999 sec	60 sec
Latitude Offset	Offsets latitude position to further refine position accuracy. Use the A:N <- - > S soft key to switch coordinate.	9.999'S – 9.999'N	0.0' (no offset)

(Continued on next page)

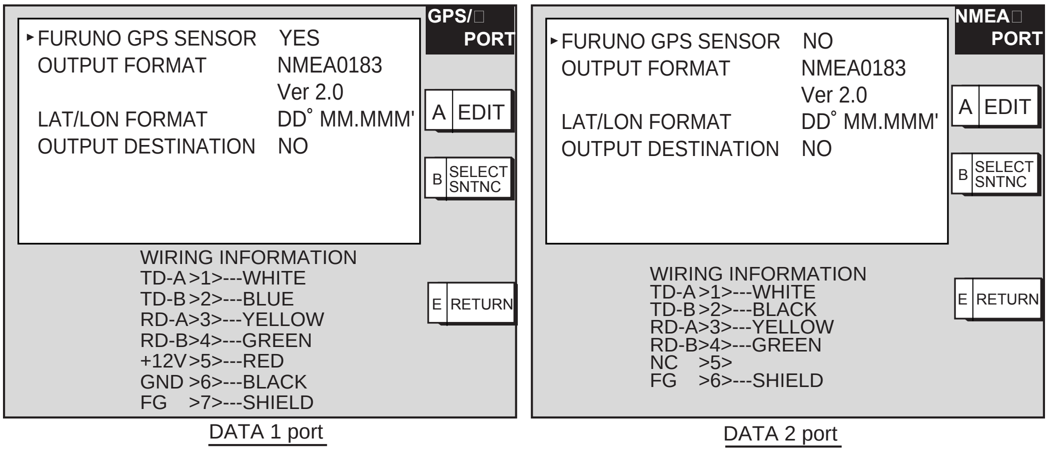
Contents of GPS sensor settings menu (con't.)

Item	Description	Settings	Default Setting
Longitude Offset	Offset for longitude. Use the A:W < - - > E soft key to switch coordinate.	9.999'E – 9.999'W	0.0' (no offset)
Disable Satellite	Every GPS satellite is broadcasting abnormal satellite number (s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key.		None
Latitude	Set initial latitude position after cold start. Use the A:N < - -> S soft key to switch coordinate.	90°S - 90°N	45°35.000'N
Longitude	Set initial longitude position after cold start. Use the A:W <- - > E soft key to switch coordinate.	180°E – 180°W	125°00.000W
Fix Mode	Choose position fixing method: 2D (three satellites in view), 2D/3D (three or four satellites in view whichever is greater).	2D, 2D/3D	2D/3D
Antenna Height	Enter the height of the GPS antenna unit above sea surface.	0-99 m	5 m
Cold Start	Clears the Almanac to receive the latest Almanac.	No, Yes	No
GPS STATUS (soft key)	Displays GPS satellite status display.		

3.6 Setting up Data Ports

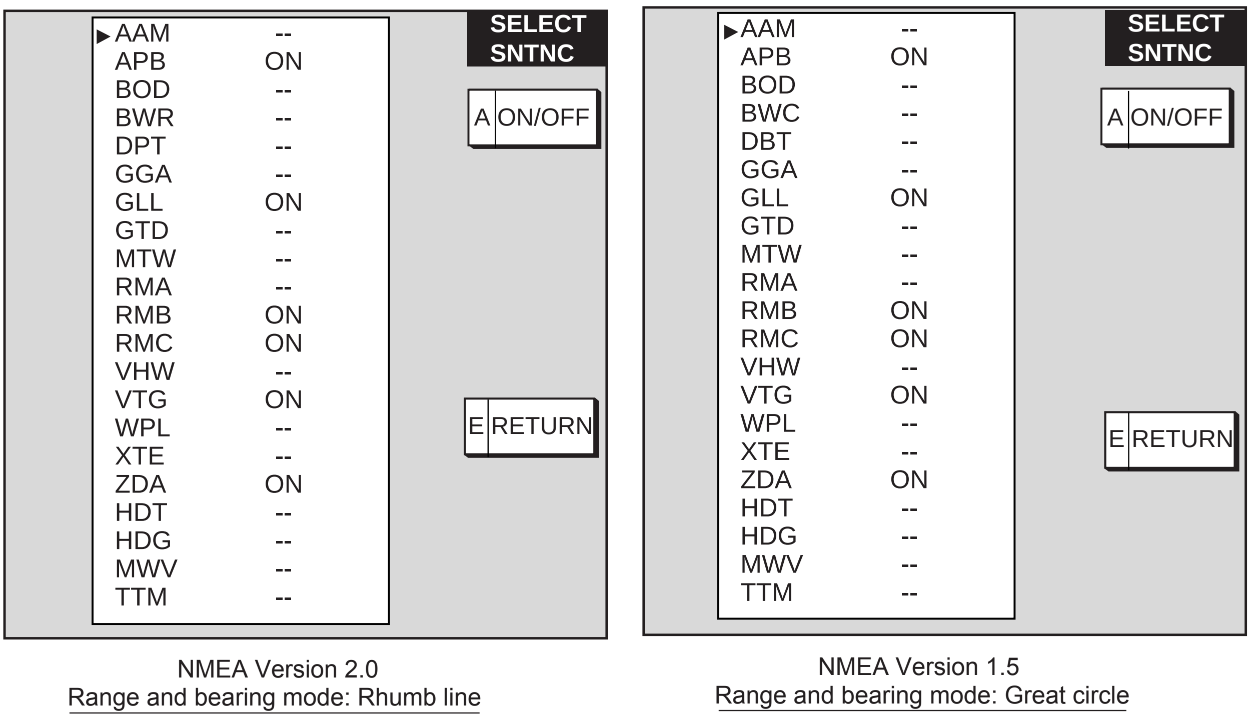
Setup the data ports according to the equipment connected to them as follows.

1. Press the [MENU] key to open the menu.
2. Press the E: SYSTEM CONFIGURATION, C: SYSTEM SETUP and A: PORT SETUP soft keys.
3. Press the A: GPS/NMEA PORT soft key for DATA 1 port, or B: NMEA PORT soft key for DATA 2 port as appropriate. One of the following displays appears depending on your selection.



DATA1, DATA2 PORT menus

4. Select item and press the A: EDIT soft key.
5. Set option referring to the table on page 3-17.
6. To select NMEA data sentences to output, press the B: SELECT SNTNC soft key. For NETWORK port, select the sentence to output to the network equipment (default: all OFF).



NMEA data sentences

7. Select sentence and press the A: ON/OFF soft key to show ON (output) or “- -“ (no output) as appropriate.
8. Press the E: RETURN soft key.
9. Press the [MENU] key to quit.

Contents of DATA 1 and DATA2 PORT menus

Item	Description	Settings	Default Setting
FURUNO GPS Sensor	Selects whether the GPS Receiver **GP-310B/320B** is connected to the DATA1 or DATA2 port or not.	Yes, No	Yes (DATA1) No (DATA2)
Output Format	Selects NMEA output version for the equipment connected.	NMEA0183 Ver. 1.5, NMEA0183 Ver. 2.0	NMEA0183 Ver. 2.0
Lat/Lon Format	Selects latitude/longitude format to output.	DD°MM.MM’, DD°MM.MMM, DD°MM.MMMM’	DD°MM.MMM’
Output Destination	Selects whether to output route (data sentence RTE) and waypoint data (data sentence WPL) when destination is set.	Yes, No	No
SELECT SNTNC (soft key)	Selects data sentence(s) to output. Select sentence with the trackball and press the ON/OFF soft key to show ON or “- -“ (OFF) as appropriate. See the figure on page 3-16 sentence and default settings.		

3.7 Remote System Setting

MODEL 1800C/1900C-BB series NavNet system can be used as a remote system for FAR/FR-2805, 2105 series, etc., by using optional cable assy MJ-B24LPF0008-100 (10 m), 200 (20 m) or 300 (30 m).

To use the processor unit as a remote system, do the following:

1. Open the RADAR SETUP menu.
2. Use the trackball or [ENTER] knob to select MONITOR MODE, and press the A: EDIT soft key.
3. Select ON.
4. Turn the MBS function off at the main radar.
5. Turn the VIDEO ADJUST on at the NavNet processor unit.
6. Select “H” at the ANTENNA TYPE on the RADAR SETUP menu.

Note: TX blanking function is not available when the MONITOR MODE is ON. To set a TX blanking sector, select OFF from MONITOR MODE on the NavNet equipment, and then set the sector same as the main radar. Finally, set MONITOR MODE to ON.

When the MONITOR MODE is ON, the following functions are not available.

•Tuning (auto/manual, on the RADAR SETUP menu)

•Antenna rotation (RADAR SETUP menu)

•TX blanking sector (RADAR DISPLAY SETUP menu)

•Watchman (RADAR DISPLAY SETUP menu)

•Pulse select (Soft key)

4. OPTIONS

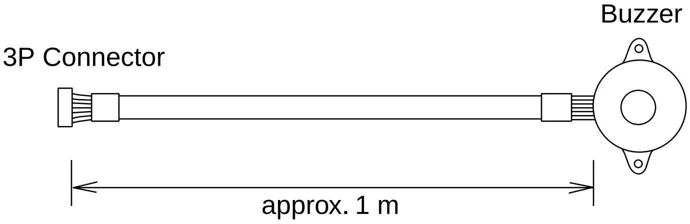
4.1 External Buzzer Connection

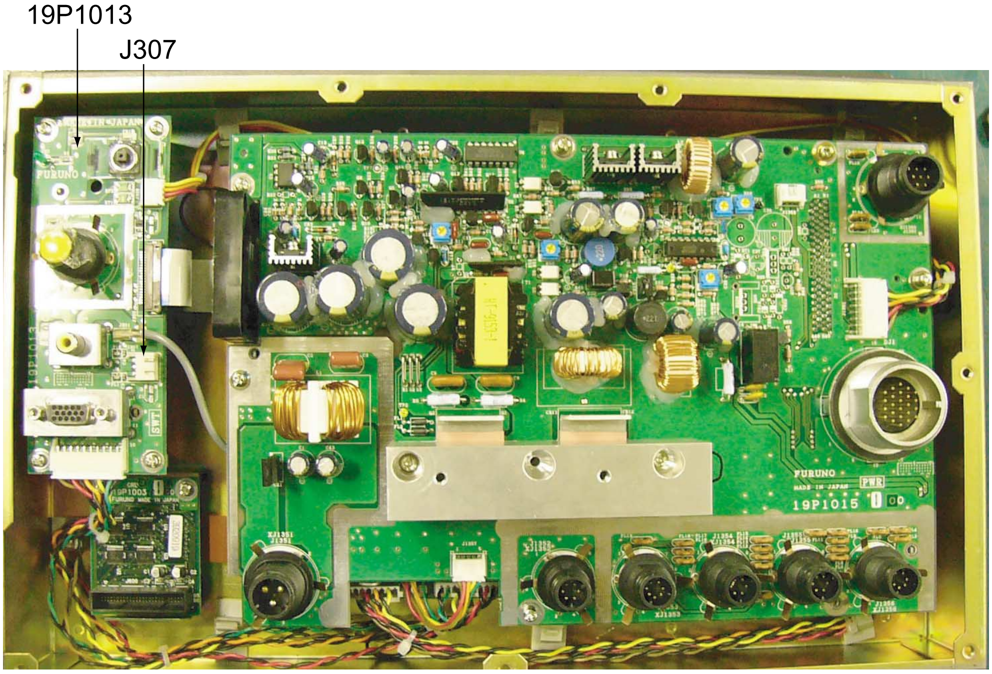
The optional external buzzer provides a louder alert when the alarm is violated.

External buzzer

Type: XH3-BZ-L970
Code no.: 000-146-422

1. Unfasten 11 screws and 9 connectors to remove the cover.
2. Use a knife to cut a “cross” in the rubber bushing on the rear cover.
3. Pass the 3P connector of the buzzer assembly through the rubber bushing from the outside of the cover.
4. Connect the 3P connector to J307 on the 19P1013 board. See below.
5. Close the cover.
6. Fix the buzzer within 1 m from the processor unit with two tapping screws.





Processor unit (cover removed)

4.2 ARP Kit ARP-11

Necessary parts

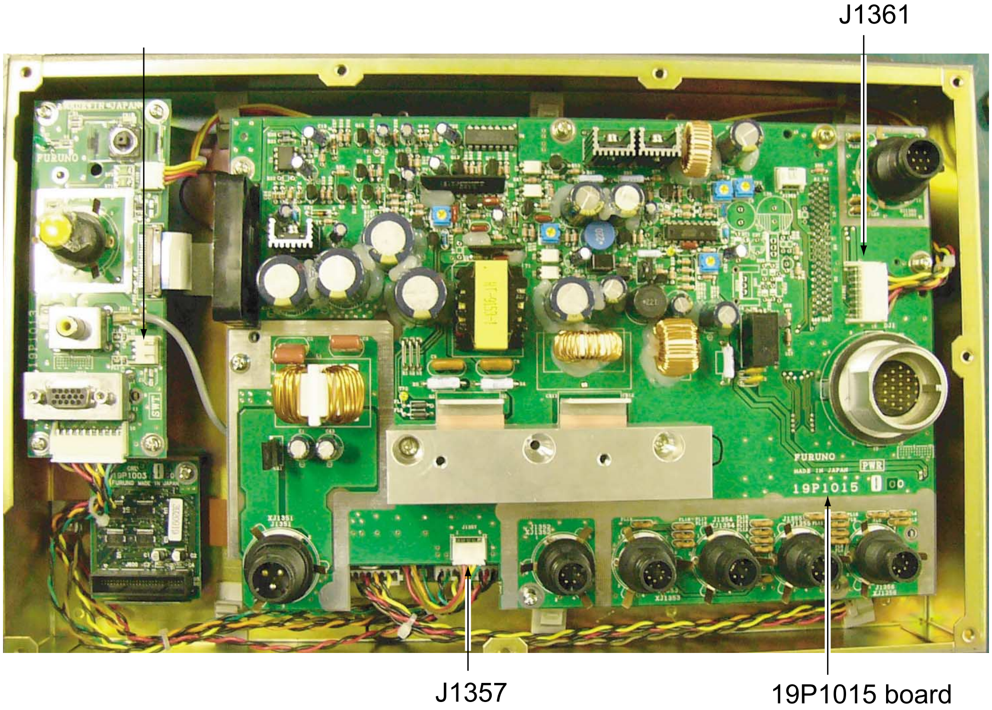
Name: ARP kit
Type: ARP-11
Code no.: 008-523-050

Table ARP-11 contents

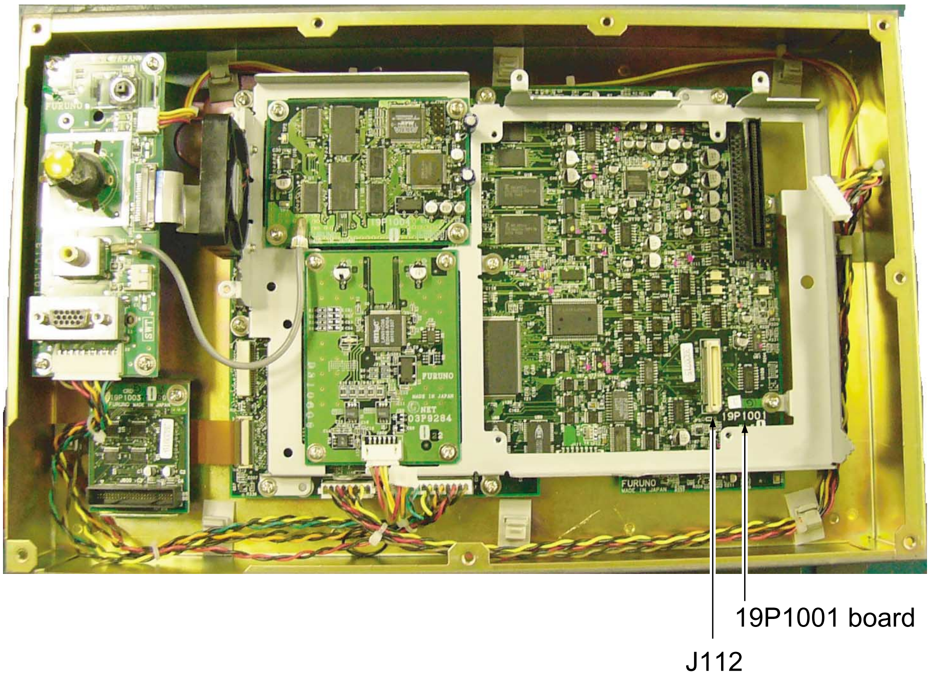
Name	Type	Code No.	Qty
ARP Board	18P9013	008-521-830	1
Pan head screw	M3x6 C2700W	000-881-403	4
Spacer*	SQ9	000-801-850	1
	SQ15	000-801-779	3
Spring washer*	M3 C5191W	000-864-204	3

*Not used

1. Unfasten 11 screws and 9 connectors to remove the cover.
2. Disconnect P1361 and P1357 from the 19P1015 board and unfasten six screws to remove the 19P1015 board and shield plate.



3. Mate P107 on the ARP Board to J112 on the 19P1001 board and fasten the ARP board with four screws.



4. Mount the shield plate and the19P1015 board and connect P1361 and P1357 to the 19P1015.
5. Reassemble the processor unit.

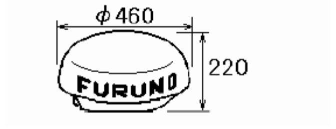
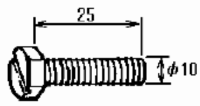
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MODEL 1823C-BB

PACKING LIST

19A0-X-9851 -1 1/1

RSB-0094-075

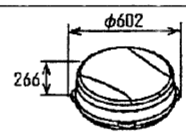
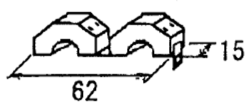
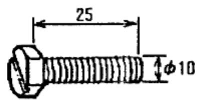
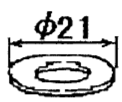
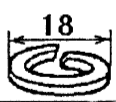
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ユニット UNIT			
空中線部 ANTENNA UNIT		RSB-0094-075 000-080-237	1
工事材料 INSTALLATION MATERIALS		CP03-25401	
六角ﾎﾞﾙﾄ ｽﾘ割 HEX.BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308	4
EMIｺｱ EMI CORE		RFC-10 000-141-085	1

MODEL 1833C-BB

PACKING LIST

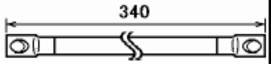
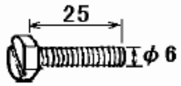
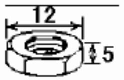
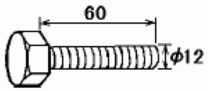
19AL-X-9852 -1 1/1

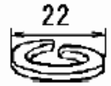
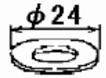
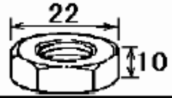
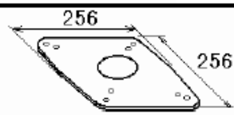
RSB-0071-057

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
(完) 空中線部 ANTENNA UNIT		RSB-0071-057 000-086-830	1
空中線部工材 ANTENNA UNIT INSTALLATION MATERIALS		CP03-16901	
EMCｺｱ EMC CORE		E04SS251512 000-144-673	1
六角ﾎﾞﾙﾄ ｽﾘ割 HEX.BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308	4
ﾐｶﾞｷ平座金 FLAT WASHER		M10 SUS304 000-864-131	4
ﾊﾞﾈ座金 SPRING WASHER		M10 SUS304 000-864-261	4

PACKING LIST RSB-0070-059, RSB-0072-060/061, RSB-0073-059/060/061/073

19AN-X-9852-1 1/1

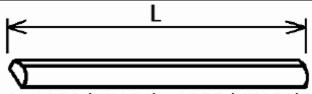
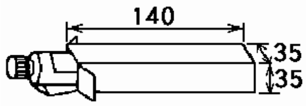
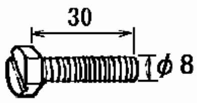
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ユニット UNIT			
空中線本体部組品 SCANNER UNIT		RSB-0072-060 008-481-190**	1
工事材料 INSTALLATION MATERIALS		**CP03-18401**	
ｱｰｽ線 GROUNDING WIRE		RW-4747-1 03S4747-2 000-566-000	1
EMIｺｱ EMI CORE		RFC-13 000-141-084	3
六角ﾎﾞﾙﾄ HEX. BOLT		M6X25 SUS304 000-862-180	1
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	1
ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 000-864-129	3
六角ﾅｯﾄ 1種 HEX. NUT		M6 SUS304 000-863-109	1
六角ﾎﾞﾙﾄ（全ﾈｼﾞ） HEX. BOLT		M12X60 SUS304 000-862-191	4

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ﾊﾞﾈ座金 SPRING WASHER		M12 SUS304 000-864-263	4
ﾐｶﾞｷ平座金 FLAT WASHER		M12 SUS304 000-864-132	4
六角ﾅｯﾄ 1種 HEX. NUT		M12 SUS304 000-863-112	4
ｷｬｯﾌﾟ CAP		040-4010 000-515-332	4
防蝕ゴム CORROSION-PROOF RUBBER MAT		03-142-3001-0 100-275-580	1
ｼｰﾙﾜｯｼｬ SEAL WASHER		03-001-3002-0 300-130-020	4

PACKING LIST

19AK-X-9856 -3 1/1

XN10A, XN12A

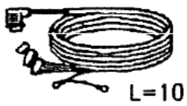
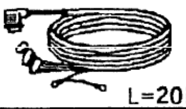
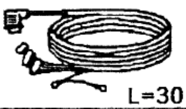
NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
アンテナ ANTENNA	 L=1036(XN10A), 1255(XN12A),	XN10A, 12A 008-523-***	1
アンテナ工材 ANTENNA INSTALLATION MATERIALS		**CP03-22901**	
Oリング O-RING		JISB2401-1A-G80 000-851-313	1
スリーボンド SEALANT		1211 50G 000-854-118	1
六角ボルト スリワリ HEX. BOLT		M8X30 SUS304 000-862-151	4
ミガキ平座金 FLAT WASHER		M8 SUS304 000-864-130	4
バネ座金 SPRING WASHER		M8 SUS304 000-864-262	4

FURUNO

CODE NO.		19AL-X-9401 -1
TYPE		1/1

工事材料表
INSTALLATION MATERIALS

MODEL1833/1833C

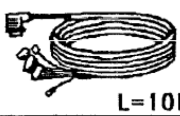
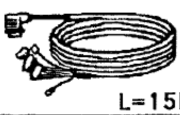
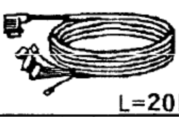
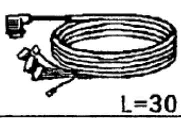
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2	ケーブル組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0002-150 CODE NO. 000-138-970	1	選択 TO BE SELECTED
3	ケーブル組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0002-200 CODE NO. 000-138-974	1	選択 TO BE SELECTED
4	ケーブル組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0002-300 CODE NO. 000-138-973	1	選択 TO BE SELECTED

FURUNO

CODE NO.		19AL-X-9402 -1
TYPE		1/1

工事材料表
INSTALLATION MATERIALS

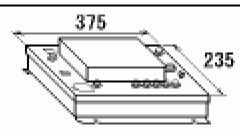
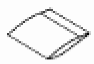
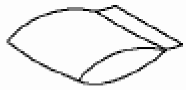
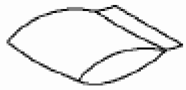
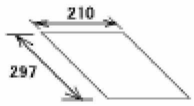
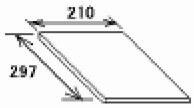
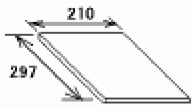
M1933C-BB/1943C-BB

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
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2	ケーブル組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0005-150 CODE NO. 000-140-435	1	選択 TO BE SELECTED
3	ケーブル組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0005-200 CODE NO. 000-140-436	1	選択 TO BE SELECTED
4	ケーブル組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0005-300 CODE NO. 000-140-437	1	選択 TO BE SELECTED

PACKING LIST

19AQ-X-9851 -0 1/1

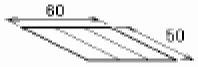
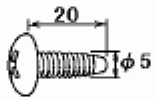
RPU-014-E-*-CS

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
制御部 PROCESSOR UNIT		RPU-014-E-N 000-080-540 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14501 008-444-420	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP03-09301 008-522-970	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-25901 008-443-690	1
図書 DOCUMENT			
ﾋｭｰｽﾞ変更のお願い NOTICE FOR FUSE REPLACEMENT		C32-00007-* 000-809-188	1
装備要領書(英) INSTALLATION MANUAL		IME-35320-* 000-147-916	1
取扱説明書(英) OPERATOR'S MANUAL		OME-35320-* 000-147-497	1
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L-5M	MJ-A3SPF0018-050Z 000-139-872	1

FURUNO

CODE NO.	008-443-690	19AQ-X-9401 -0
TYPE	CP03-25901	1/1

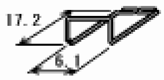
工事材料表
INSTALLATION MATERIALS

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾋｭｰｽﾞﾊﾘﾏｰｸ FUSE LABEL		03-153-1312-0 CODE NO. 100-292-140	1	
2	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ CODE NO. 000-802-081	4	

FURUNO

CODE NO.	008-522-970	19AQ-X-9501 -0
TYPE	FP03-09301	1/1

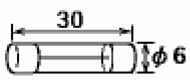
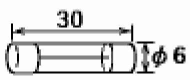
付属品表
ACCESSORIES

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｶｰﾄﾞ用ﾋﾟﾝ CARD REMOVER		03-153-1311-0 CODE NO. 100-292-130	1	

FURUNO

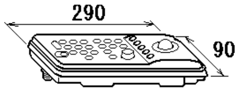
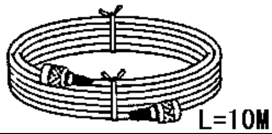
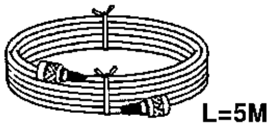
CODE NO.	008-444-420	19AQ-X-9301 -0 1/1
TYPE	SP03-14501	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO 7A AC125V			3	000-549-013
2	ﾋｭｰｽﾞ FUSE		FGBO 15A AC125V			3	000-549-014

PACKING LIST

RCU-017-E-5-CS/RCU-017-E-10-CS

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
操作部 CONTROL UNIT		RCU-017-E 000-080-537	1
その他部品 OTHER PARTS			
ﾊｰﾄﾞｶﾊﾞｰ HARD COVER		06-021-2121-1 100-320-101	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP03-10001 008-537-530	1
工事材料 INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A7SPF0006-100 000-143-578	1 (*)
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A7SPF0006-050 000-147-879	1 (*)

(*)印のｹｰﾌﾞﾙ組品は選択出来ます。
(*) MARKED CABLES ARE SELECTABLE.

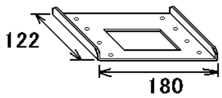
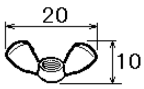
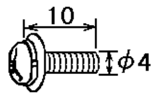
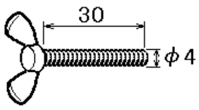
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-537-530	19AQ-X-9503 -1
TYPE	FP03-10001	1/1

付属品表

ACCESSORIES

番 号 NO.	名　称 NAME	略　図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	フラッシュマウント金具 MOUNTING PLATE		19-023-1051-0 CODE NO. 100-307-920	1	
2	蝶ナット WING NUT		M4 YBSC2 MBNI2 CODE NO. 000-863-306	4	
3	+-ナベ゛セムスネジ゛B WASHER HEAD SCREW		M4X10 C2700W MBNI2 CODE NO. 000-881-446	4	
4	蝶ボ゛ルト WING SCREW		M4X30 YBSC2 MBNI2 CODE NO. 000-804-799	4	

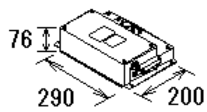
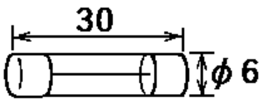
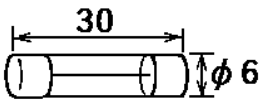
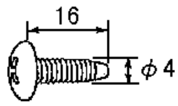
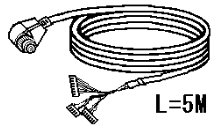
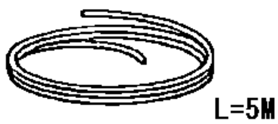
19AQ-X-9503

FURUNO ELECTRIC CO ., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

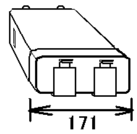
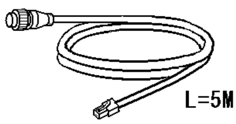
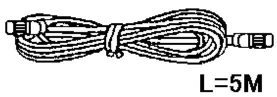
PSU-005

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
空中線電源部 POWER SUPPLY UNIT		PSU-005 000-080-190	1
予備品 SPARE PARTS		**SP03-14001**	
ﾋｭｰｽﾞ FUSE		FGBO 7A AC125V 000-549-013	3
ﾋｭｰｽﾞ FUSE		FGBO 15A AC125V 000-549-014	3
工事材料 INSTALLATION MATERIALS		**CP03-24501**	
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ SELF-TAPPING SCREW		4X16 SUS304 1ｼｭ 000-802-080	4
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-B24LPF0009-050 000-145-887	1
ｹｰﾌﾞﾙ組品 CABLE ASSY.		VL3P-VV-S2X2C-AA050 000-152-217	1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

CU-200-NAVBB-*

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ﾒﾓﾘｰｶｰﾄﾞｲﾝﾀｰﾌｪｲｽ MEMORY CARD INTERFACE		CU-200 000-081-569	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-27401 008-539-520	1
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品 CABLE ASSY.		MJ-A6SPF/TM11AP8C050 000-146-289	1 (*1)
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0026-050 000-149-445 **	1 (*1)

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDED BY ″**″ INDICATES THE NUMBER OF TYPICAL MATERIAL.

2.(*1)印のｹｰﾌﾞﾙ組品は、5m,10mの長さがあります。
5m,10m CABLE IS SELECTIVE ON DEMAND.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

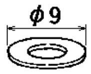
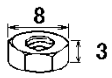
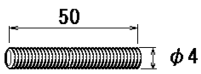
FURUNO

CODE NO.	008-539-520	03GO-X-9403 -0
TYPE	CP03-27401	1/1

工事材料表

INSTALLATION MATERIALS

CU-200

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾊﾞﾈ座金 SPPING WASHER		M4 SUS304 CODE NO. 000-864-256	4	
2	ﾐｶﾞｷ平座金 FLAT WASHER		M4 SUS304 CODE NO. 000-864-126	4	
3	六角ﾅｯﾄ　一種 HEX.NUT		M4 SUS304 CODE NO. 000-863-106	4	
4	寸切ﾎﾞﾙﾄ THREADED ROD		M4X50 SUS304 CODE NO. 000-147-539	4	

03GO-X-9403

FURUNO ELECTRIC CO .,LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

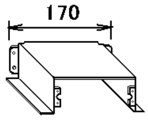
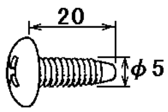
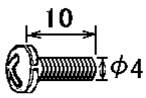
FURUNO

CODE NO.	008-539-530	03GO-X-9502 -0
TYPE	FP03-10201	1/1

付属品表

ACCESSORIES

CU-200 Desktop mount kit

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ﾊﾝｶﾞｰ MOUNTING BRACKET		19-023-3081-0		1	
			CODE NO.	100-316-250		
2	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ		4	
			CODE NO.	000-802-081		
3	+-ﾅﾍﾞｾﾑｽﾈｼﾞA WASHER HEAD SCREW		M4X10 C2700W MBNI2		4	
			CODE NO.	000-881-145		

03GO-X-9502

FURUNO ELECTRIC CO .,LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

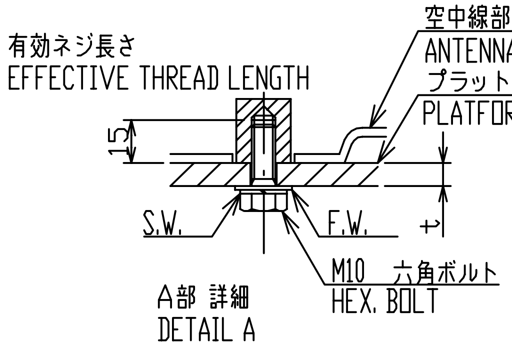
FURUNO

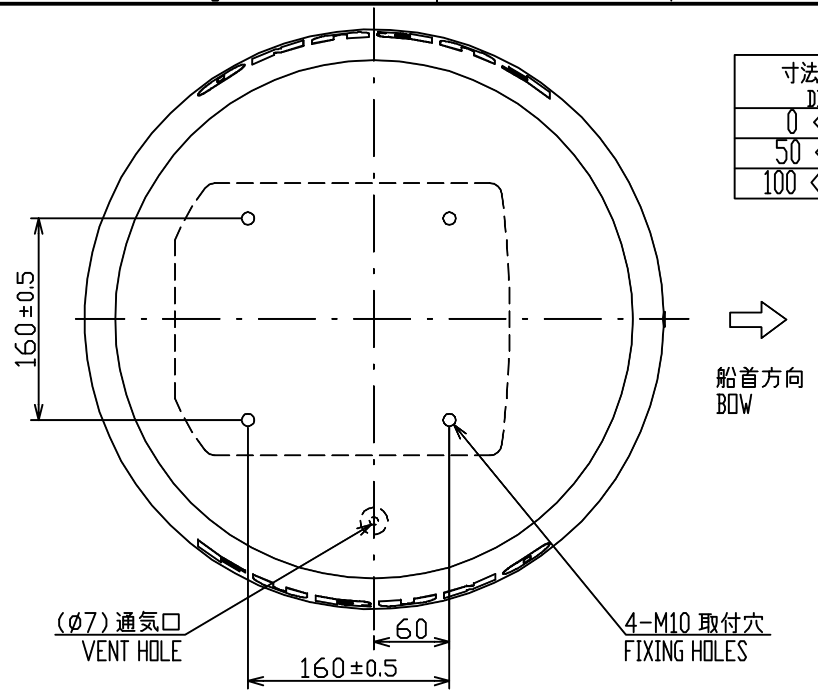
表2 TABLE 2

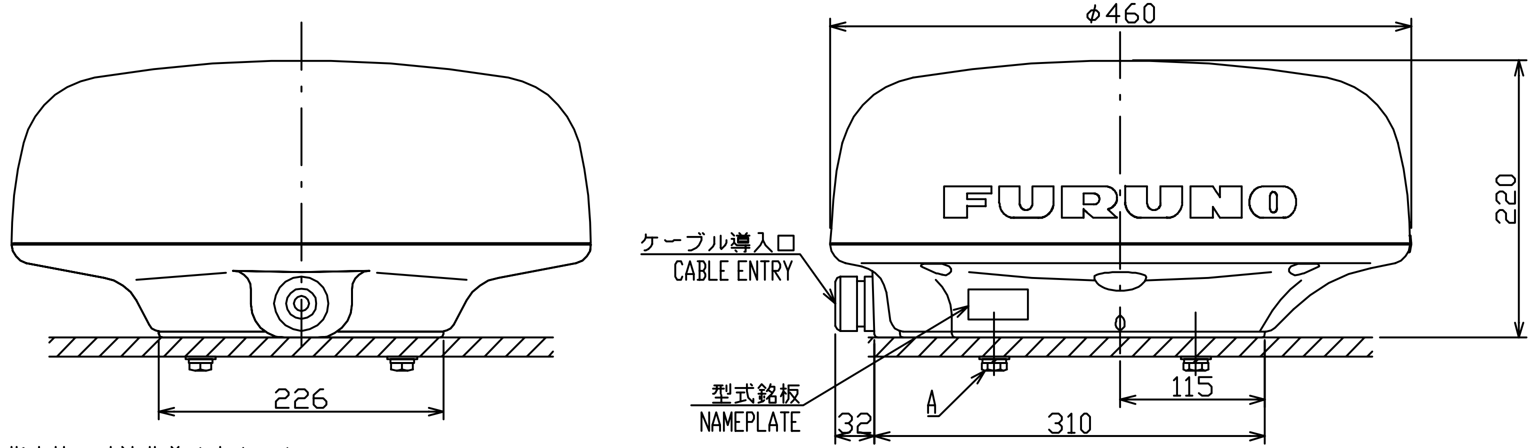
MODEL	MASS (kg ±10%)
RSB-0087/0087A/110	4.9
RSB-0094	5.2
RSB-0095	5.1

表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3







注記 1) 指定外の寸法公差は表1による。
2) 取付はM10ボルトを使用のこと。
ネジ長さは板厚tに応じて、20 (t≦5)または25 (5<t≦10)とする。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M10 BOLTS FOR FIXING UNIT.
SCREW LENGTH SHALL BE ACCORDING TO PLATFORM THICKNESS:
20 (t≦5) OR 25 (5<t≦10).

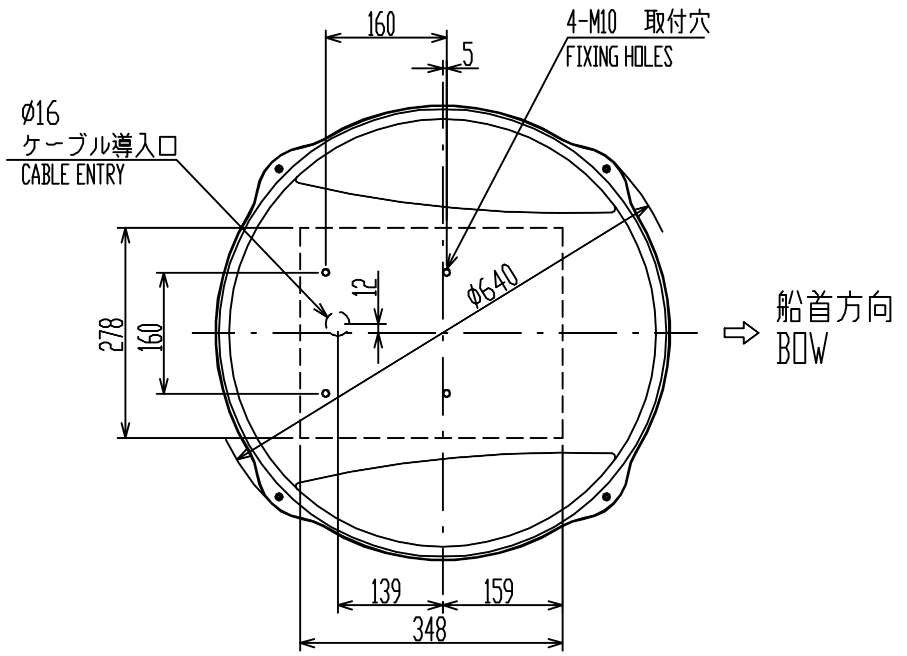
DRAWN	Jan. 12, '05 E. MIYOSHI	MODEL 1724C MODEL 1824C/1824C-BB	TITLE	RSB-0087/0087A/0094/0095/110
CHECKED	TAKAHASHI.T	MODEL 1715 MODEL 1823C	名称	空中線部
APPROVED	Y. Hatai	MODEL 1722/1722C/1723C MODEL 1712		外寸図
SCALE	1/6 MASS TABLE 2 表2 kg		NAME	ANTENNA UNIT
DWG.No.	C3489-G02- H	03-161-100G-3/03-164-300G-1		OUTLINE DRAWING

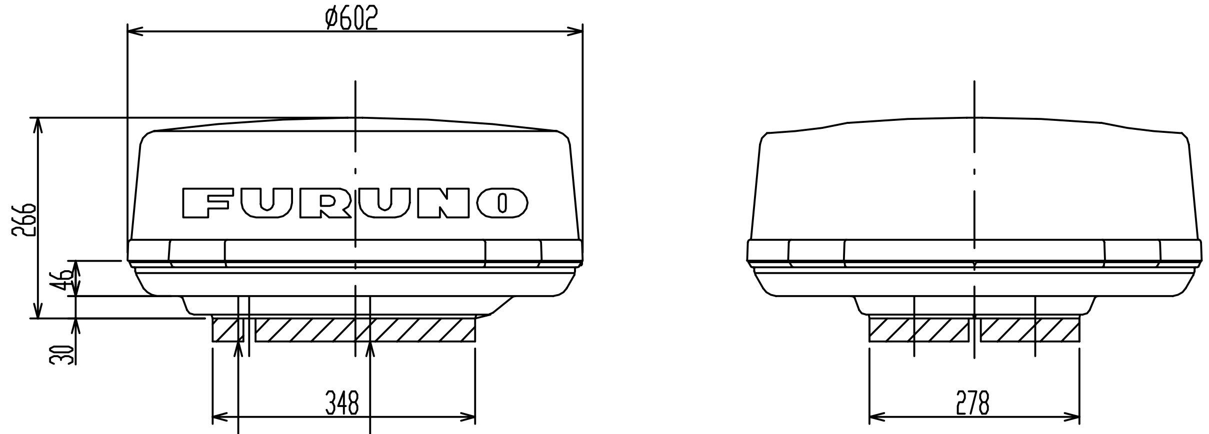
FURUNO ELECTRIC CO., LTD.

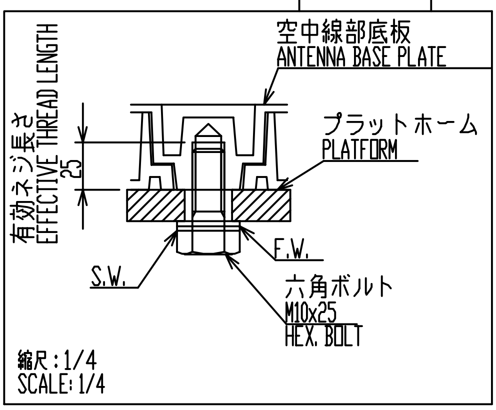
FURUNO

表1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3
500 < L ≦ 1000	±4







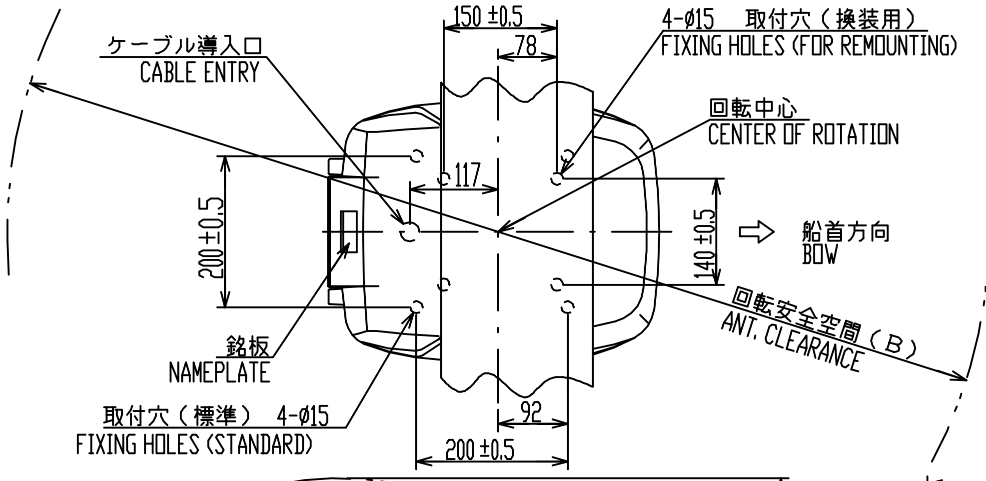
注記
指定外の寸法公差は表1による。

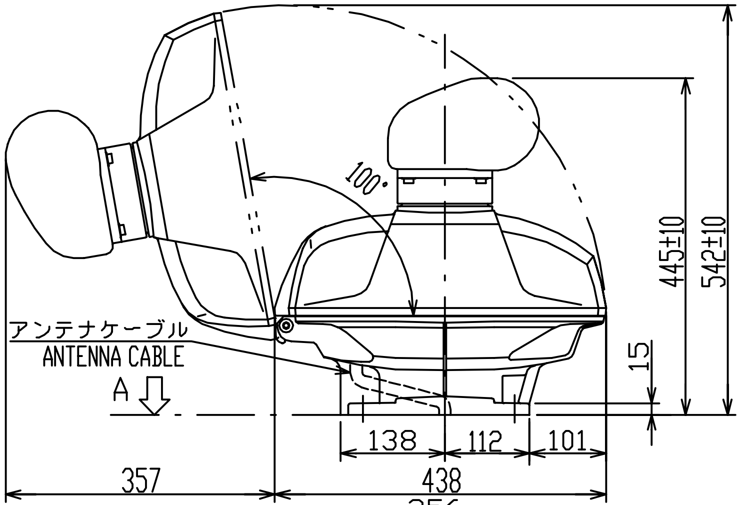
NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

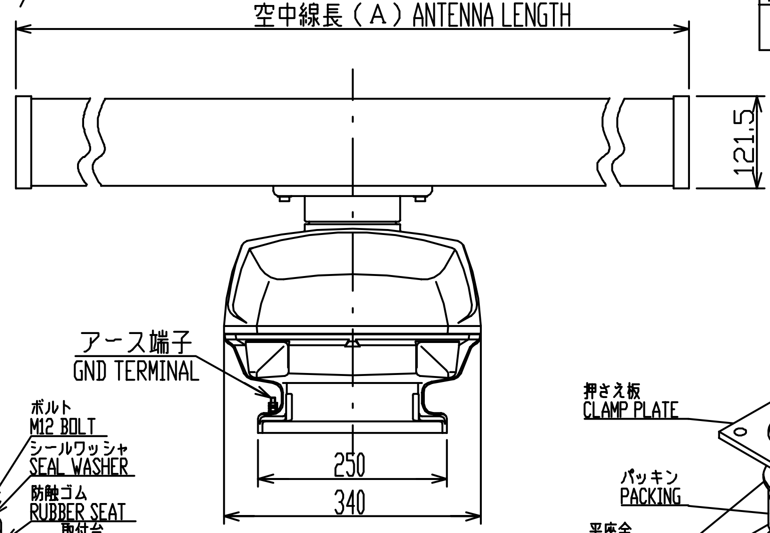
DRAWN Feb. 3, '05	E. MIYOSHI	MODEL 1734C MODEL 1834C/1834C(-BB)	TITLE RSB-0071
CHECKED	TAKAHASHI. T	MODEL 1833/1833C MODEL 1732/1732C	名称 空中線部
APPROVED	Y. Hatai	RS-1000 MODEL 1832	外寸図
SCALE 1/10	MASS 8 ±10% kg		NAME ANTENNA UNIT
DWG.No.	C3441-G01- G	03-136-6001-G2	OUTLINE DRAWING

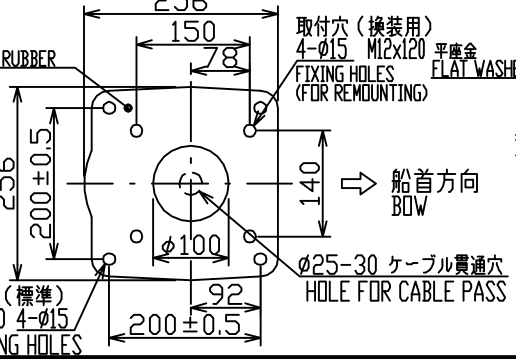
FURUNO ELECTRIC CO., LTD.

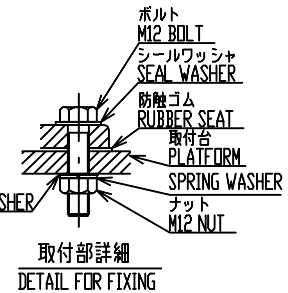
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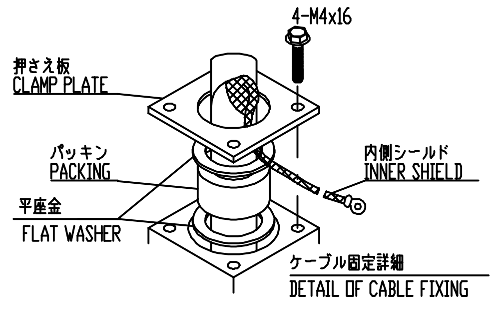












注　記

1） 指定外寸法公差は表2による。
2） 取付はM12ボルトを使用のこと。
3） 本機取付台にø25-30のケーブル貫通穴を開ける。

NOTE

1. TABLE 2 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M12 BOLTS FOR FIXING THE UNIT.
3. MAKE A HOLE ø25-30 ON MOUNTING MAST FOR CABLE PASS.

表 2　TABLE 2

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3
500＜L≦1000	±4
1000＜L≦2000	±5

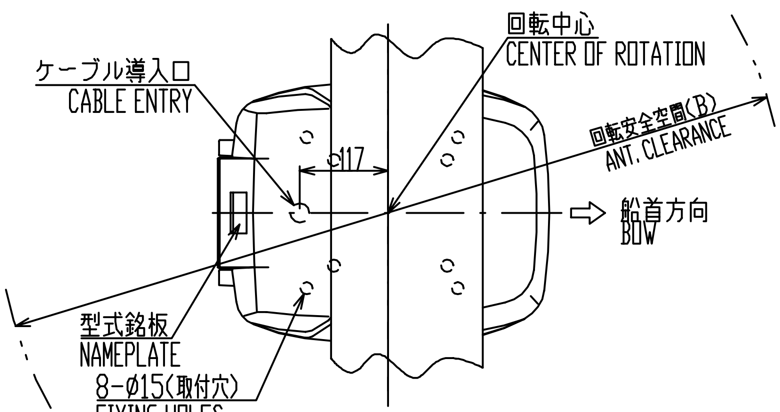
表 1　TABLE 1

種類 TYPE	XN10A	XN12A
空中線長(A) ANT. LENGTH (mm)	1036±10	1255±10
回転安全空間(B) ANT. CLEARANCE (mm)	1200	1400
質量(kg) MASS (±10%)	22	23

DRAWN	Jan. 12, '05 E. MIYOSHI	MODEL 1934C-BB/1944C-BB	TITLE RSB-0070/0073
CHECKED	TAKAHASHI. T	MODEL 1934C/1944C/1954C MODEL 1933CR	名称 空中線部
APPROVED	Y. Hatai	MODEL 1933 MODEL 1762/C	外寸図
SCALE	1/10　MASS 表1参照 SEE TABLE 1		NAME ANTENNA UNIT
DWG.No.	C3500-G01- D	03-142-300G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注記
1） 指定外寸法公差は表1による。
2） 取付はM12ボルトを使用のこと。
3） 空中線部の取付台にø25−30のケーブル貫通穴を開ける。
4） 初期製造分は取付穴寸法240x240で出荷しております。
換装時に注意してください。

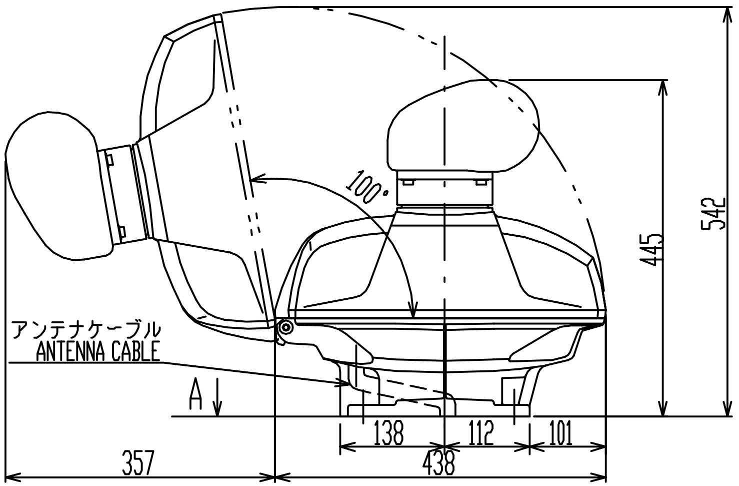
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M12 BOLTS FOR FIXING THE UNIT.
3. MAKE A HOLE ø25-30 ON MOUNTING BASE FOR CABLE ENTRY.
4. NOTE FOR REPLACEMENT: FIXING HOLE DIMENSIONS ARE CHANGED FROM 240x240 OF PREVIOUS SETS TO 200x200.

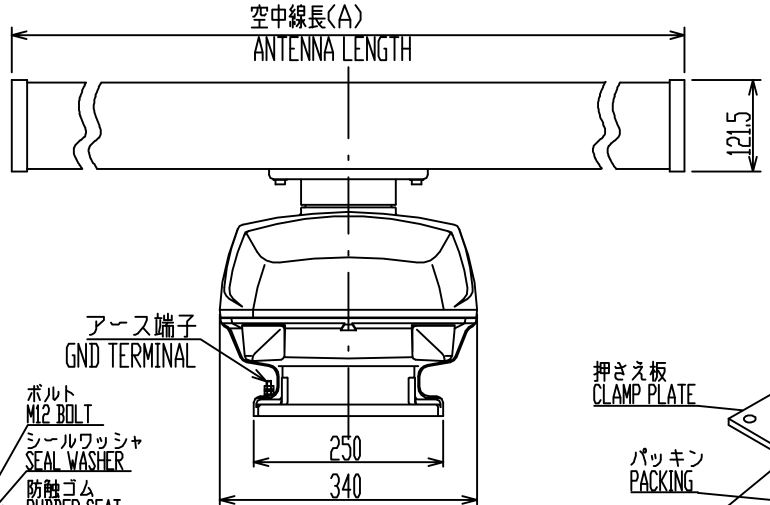
表1 TABLE 1

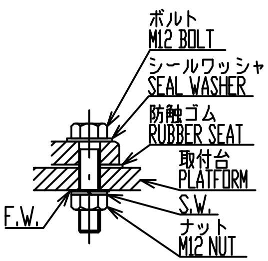
寸法範囲（mm） DIMENSIONS	公差（mm） TOLERANCE
0＜L≦50	±1.5mm
50＜L≦100	±2.5mm
100＜L≦500	±3mm
500＜L≦1000	±4mm
1000＜L≦2000	±5mm

表2 TABLE 2

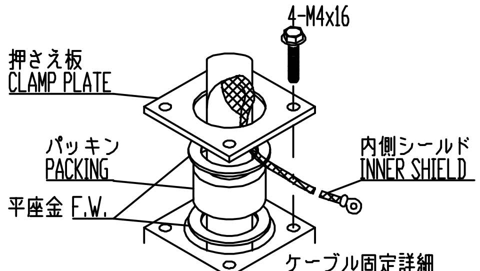
種類 TYPE	XN12A	XN13A
空中線長(A) ANT. LENGTH(mm)	1255±10	1795±10
安全空間(B) ANT. CLEARANCE(mm)	1400	1940
質量(kg) MASS	25	27



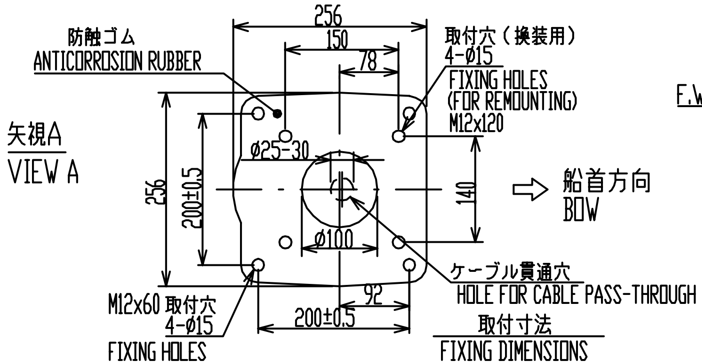




取付部詳細
DETAIL FOR FIXING



ケーブル固定詳細
DETAIL OF CABLE FIXING



矢視A
VIEW A

取付寸法
FIXING DIMENSIONS

DRAWN Apr. 4, '05 E. MIYOSHI	MODEL 1964C/1964C-BB MODEL 1954C/1954C-BB	TITLE	RSB-0070/0072/0073 (XN12A/13A)
CHECKED TAKAHASHI. T	FR-7041R M2 FRS/RS-1000C	名称	空中線部
APPROVED Y. Hatai	MODEL1942M2 FR-7062/7112/7252, FR-8XX2 SERIES		外寸図
SCALE 1/10 MASS 表2に記載 SEE TABLE 2		NAME	ANTENNA UNIT
DWG.No. C3459-G03- F	03-142-300G-5		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

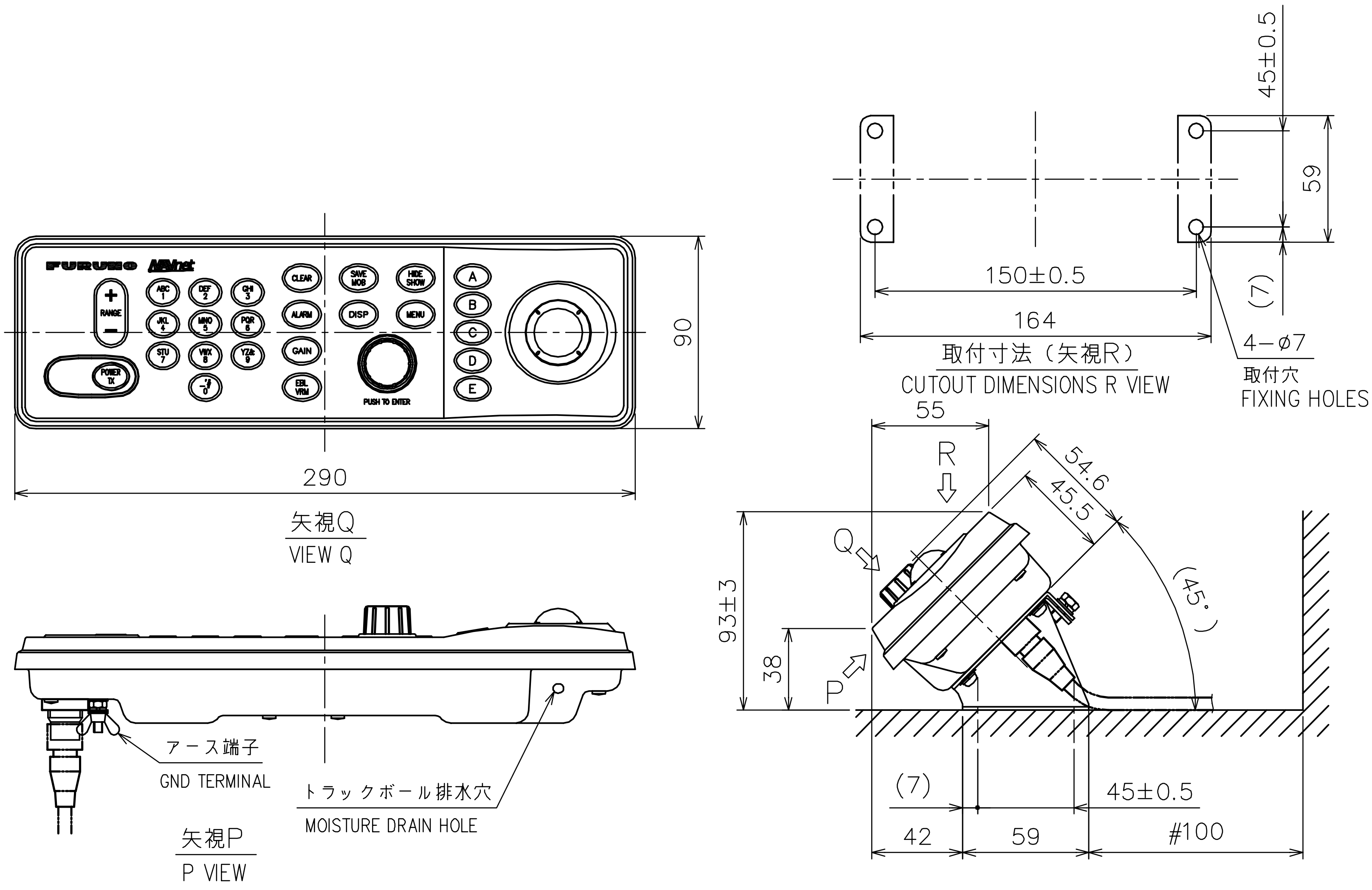


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

注　記　１）　＃印寸法は最小サービス空間寸法とする。

２）　指定外の寸法公差は表１による。

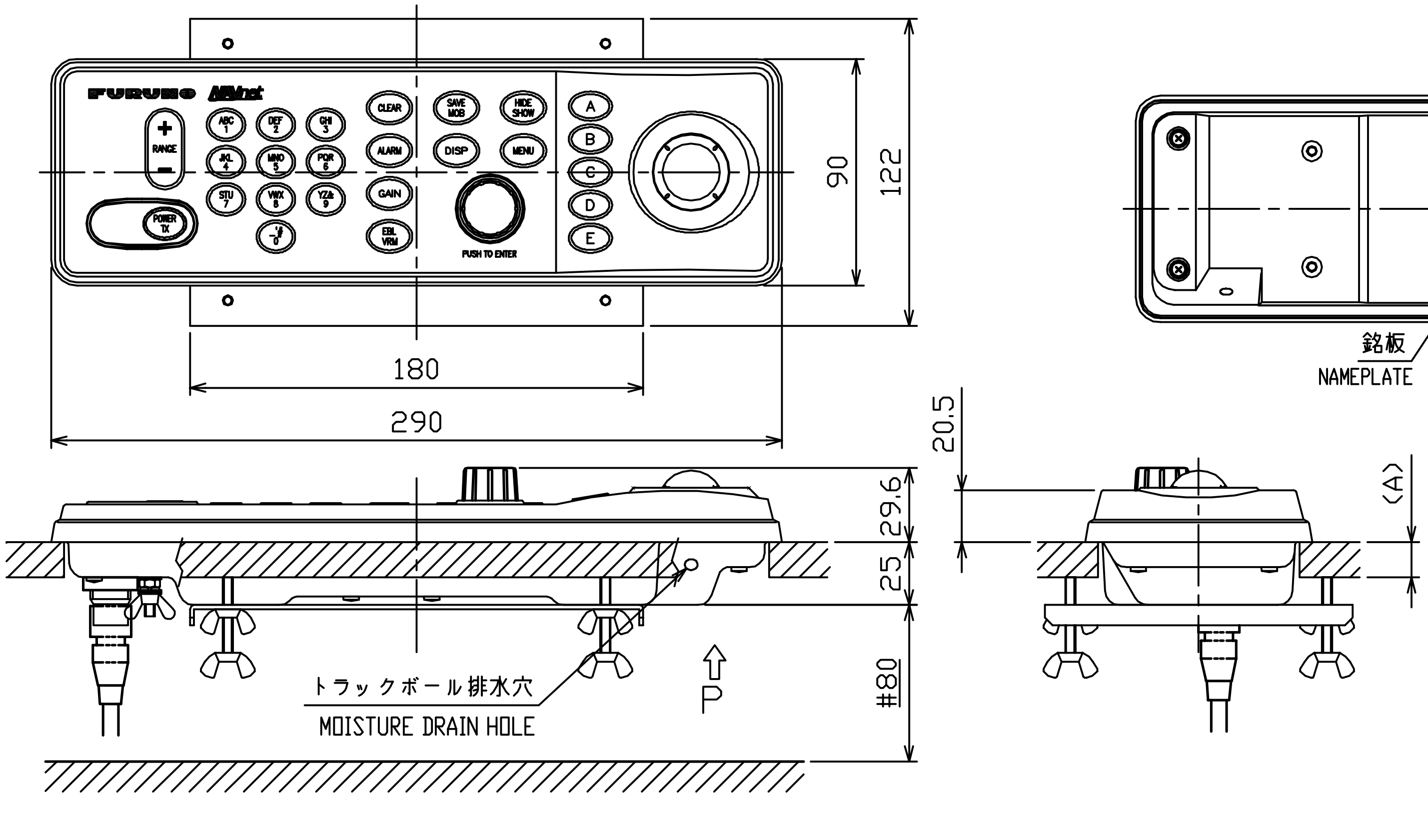
３）　取付用ネジは＋トラスタッピンネジ呼び径５ｘ２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE 5X20 TAPPING SCREWS FOR FIXING THE UNIT.

DRAWN Dec. 3, '04	E. MIYOSHI	GD-1920C-BB MODEL 1934C-BB/1944C-BB/1954C-BB MODEL 1824C-BB/1834C-BB MODEL 1833C-BB series	TITLE	RCU-017
CHECKED	TAKAHASHI. T		名称	操作部（卓上装備）
APPROVED	Y. Hatai			外寸図
SCALE 1/3	MASS 1.0 ±10% kg		NAME	CONTROL UNIT (TABLETOP MOUNT)
DWG No. C3532-G01-C		19-023-110G-3		OUTLINE DRAWING

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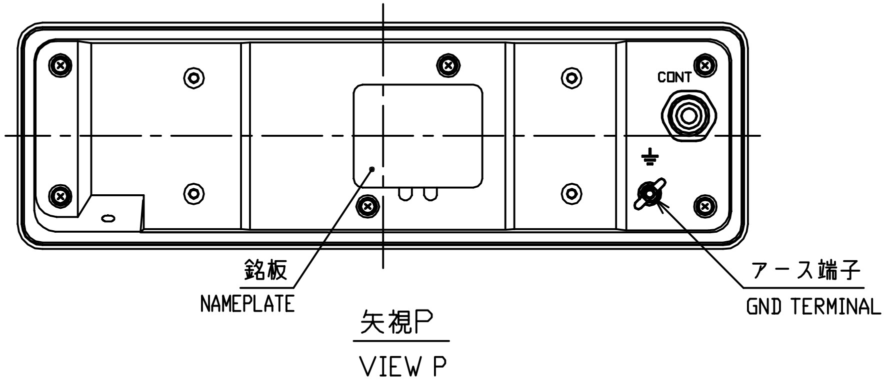
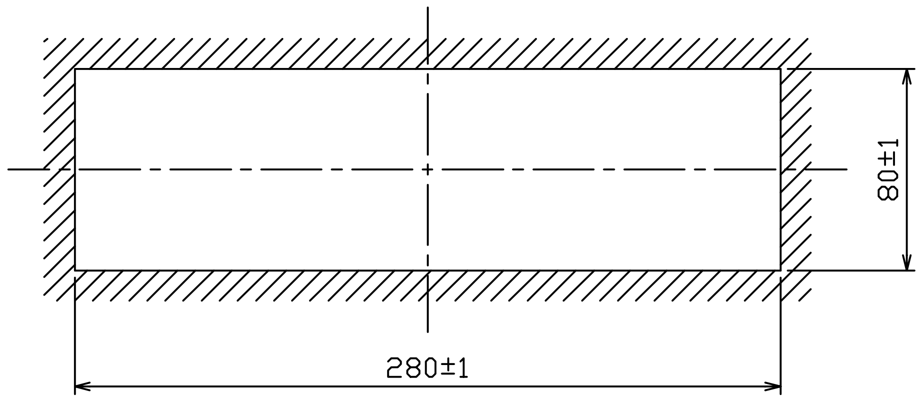


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3



取付穴寸法図

CUTOUT DIMENSIONS

注 記 1）＃印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）壁の厚さ（Ａ）は最小１０最大２０とする。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. THICKNESS (A) OF PANEL IS 10-20 MM.

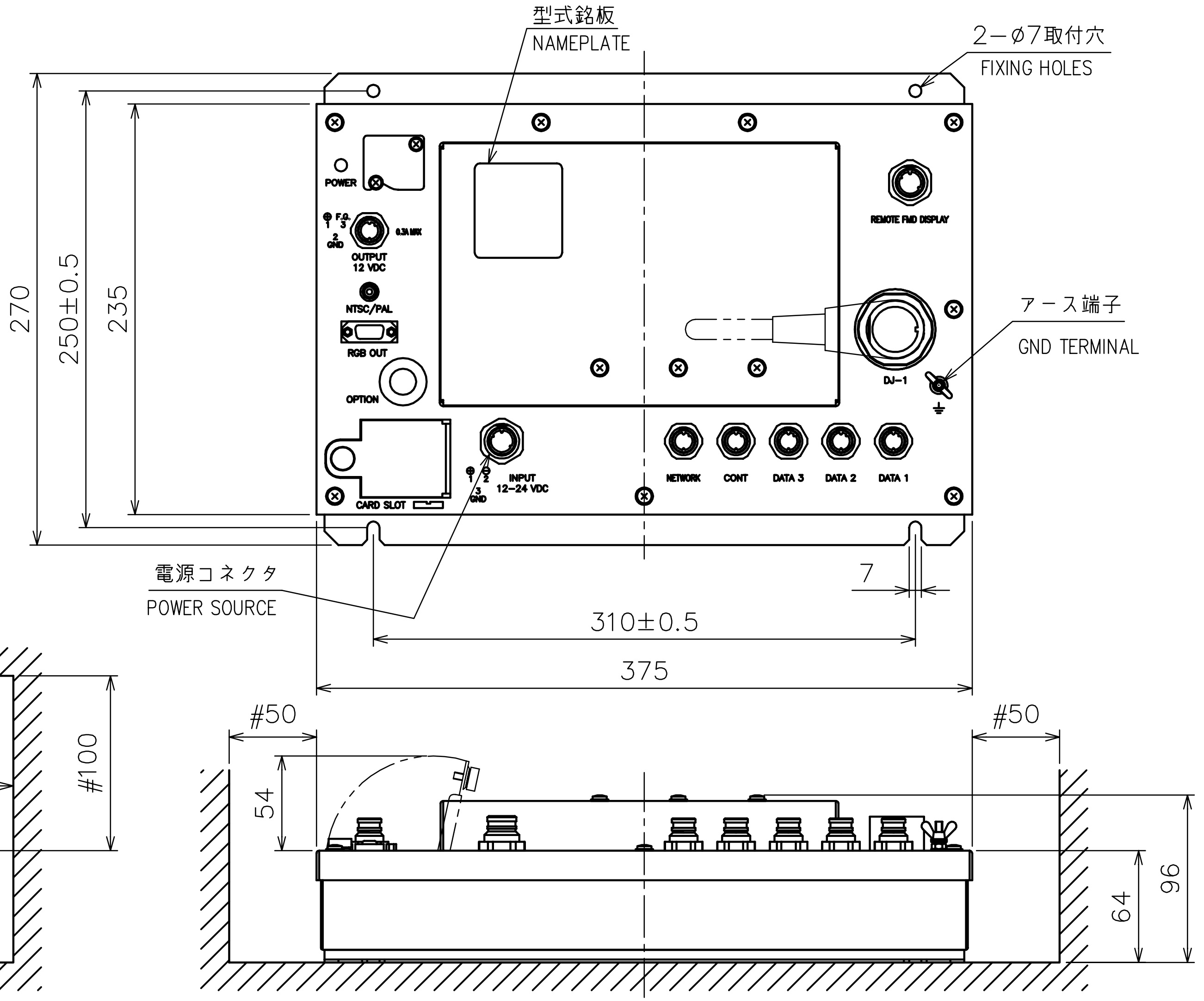
DRAWN Jan. 12, '05 E. MIYOSHI	GD-1920C-BB MODEL 1934C-BB/1944C-BB/1954C-BB MODEL 1824C-BB/1834C-BB MODEL 1833C-BB series	TITLE	RCU-017
CHECKED TAKAHASHI. T		名称	操作部（埋込装備）
APPROVED Y. Hatai			外寸図
SCALE 1/3 MASS 0.9 ±10% kg		NAME	CONTROL UNIT (FLUSH MOUNT)
DWG No. C3532-G02-C	19-023-100G-3		OUTLINE DRAWING

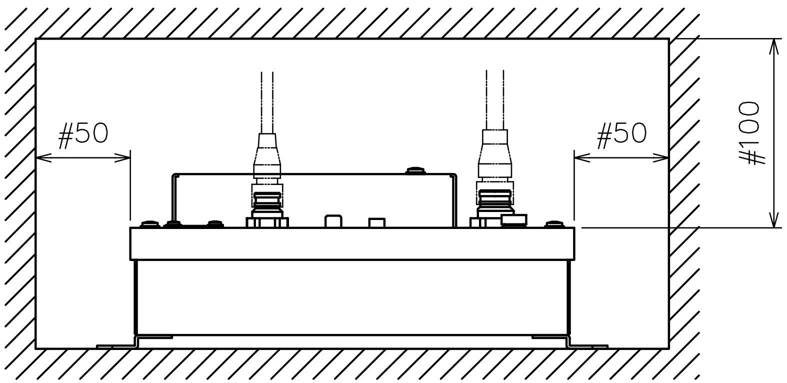
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表 1
TABLE 1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３





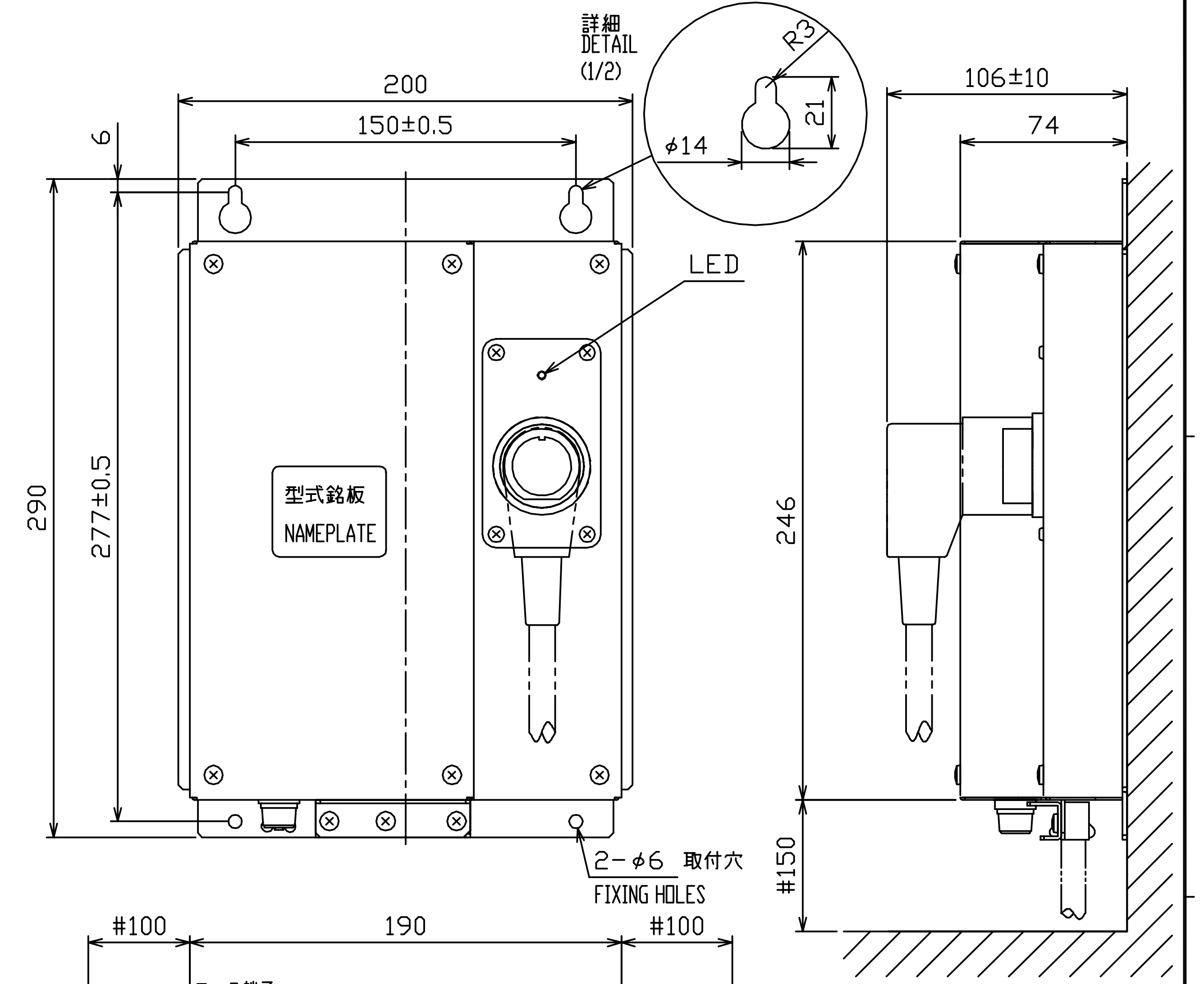
注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジは＋トラスタッピンネジ呼び径５ｘ２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE 5X20 TAPPING SCREWS FOR FIXING THE UNIT.

DRAWN 23 Oct. 2003	E. MIYOSHI	TITLE	RPU-014
CHECKED	Takahashi T.	名称	制御部
APPROVED	MODEL 1833C-BB series		外寸図
SCALE 1/4	MASS 4.1 ±10% kg	NAME	PROCESSOR UNIT OUTLINE DRAWING
DWG No. C3532-G03-B	19-023-200G-5		

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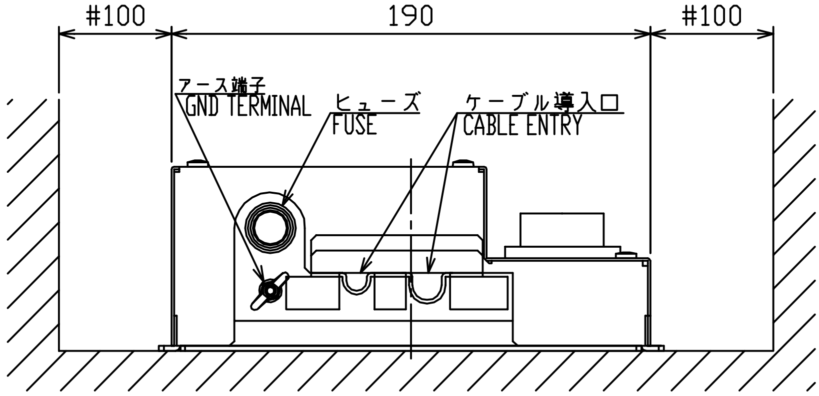


表1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジは＋トラスタッピンネジ呼び径４×１６を使用のこと。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 4x16 FOR FIXING THE UNIT.

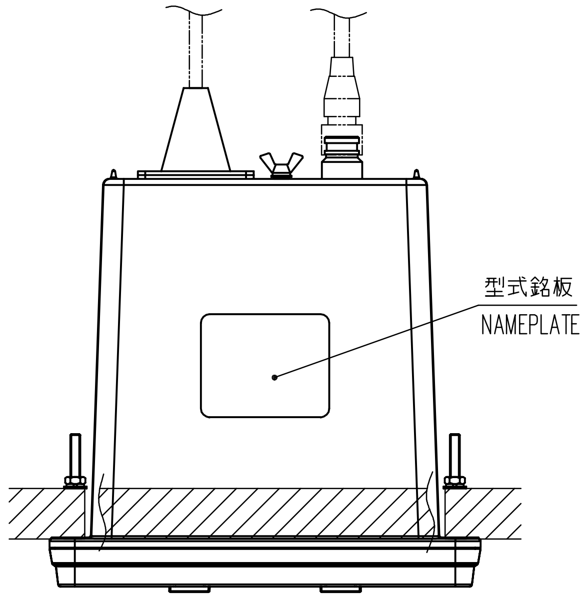
DRAWN Dec. 8, '02 E. MIYOSHI		TITLE	PSU-005
CHECKED TAKAHASHI.T	MODEL 1954C-BB	名称	電源部
APPROVED Y. Hatai	MODEL 1954C MODEL 1953C		外寸図
SCALE 1/3	MASS 1.9 kg ±10%	NAME	POWER SUPPLY UNIT
DWG.No. C3512-G01-B	19-022-200G-2		OUTLINE DRAWING

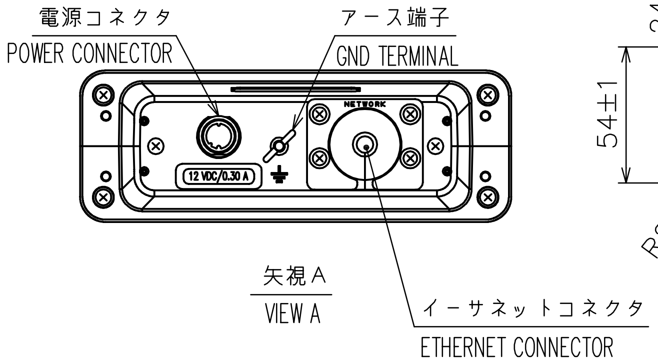
FURUNO ELECTRIC CO., LTD.

FURUNO

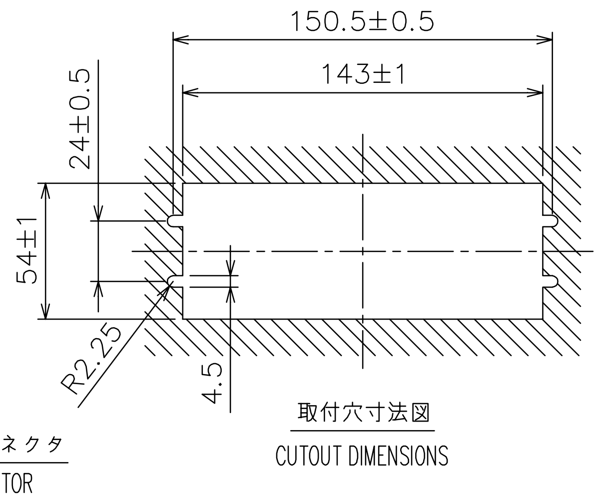
表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

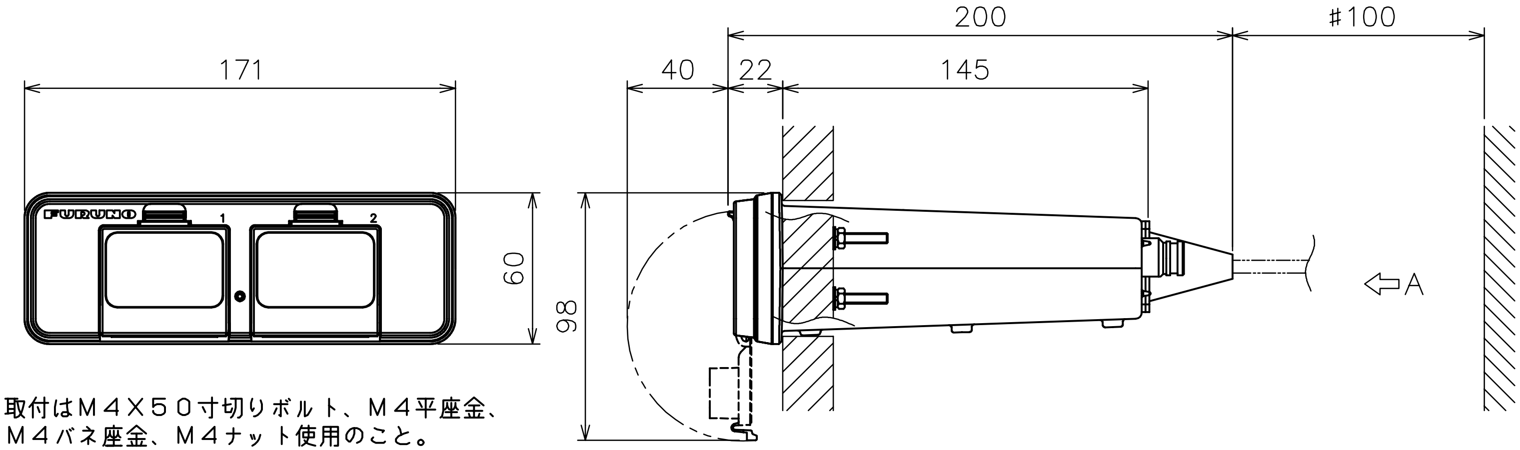




矢視A
VIEW A



取付穴寸法図
CUTOUT DIMENSIONS

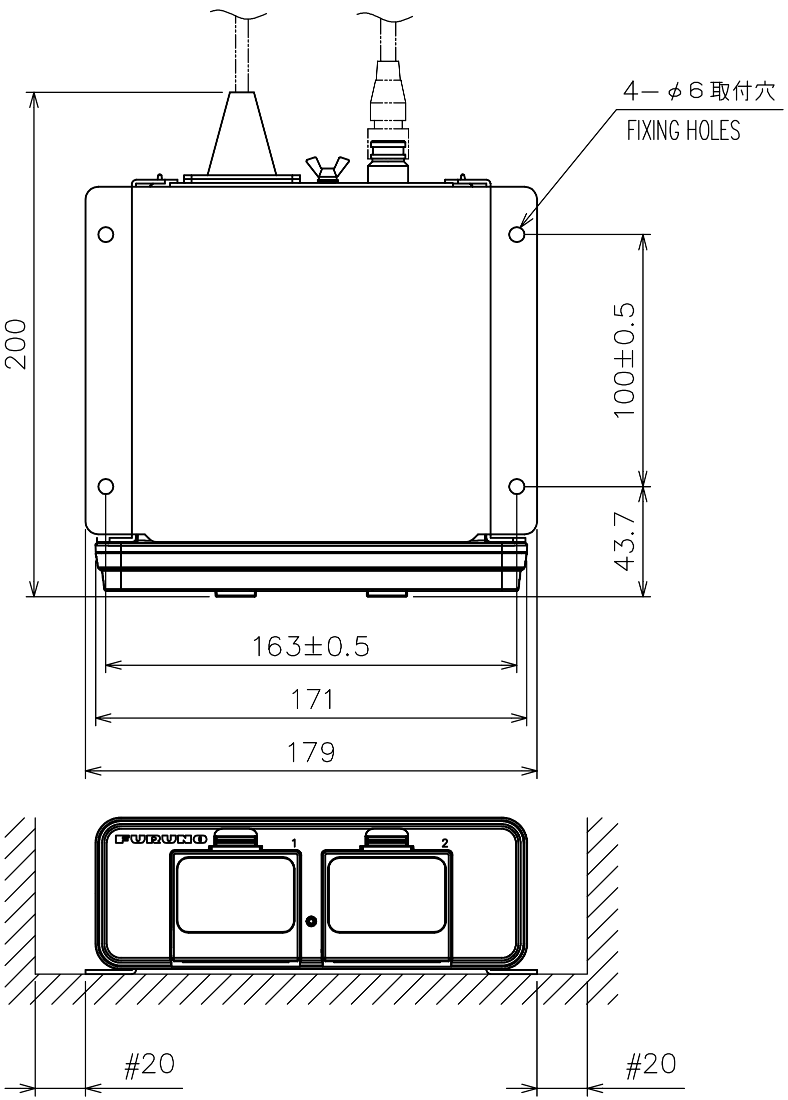


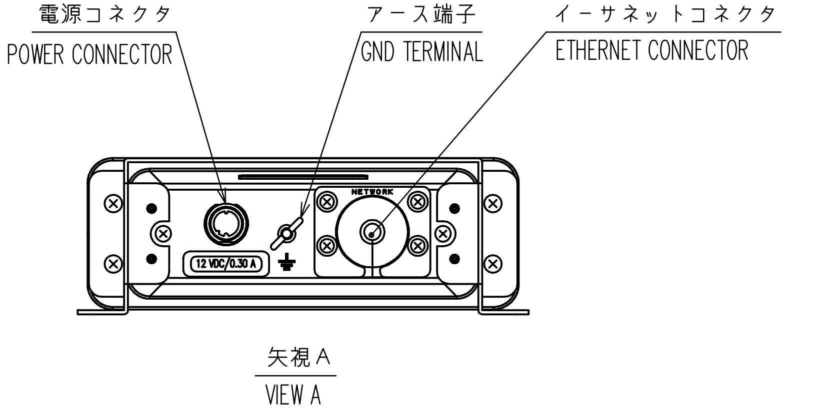
注 記 1） 取付はＭ４Ｘ５０寸切りボルト、Ｍ４平座金、Ｍ４バネ座金、Ｍ４ナット使用のこと。
2） ＃印寸法は最小サービス空間寸法とする。
3） 指定外の寸法公差は表１による。

NOTE
1. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERG AND M4 NUTS FOR FIXING.
2. #: MINIMUM SERVICE CLEARANCE.
3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED	TAKAHASHI. T	MODEL 1833C	名称	防水型カードインターフェイス(埋込装備)
APPROVED	Y. Hatai	MODEL 1833C-BB		外寸図
SCALE 1/3	MASS 0.8 ±10% kg		NAME	MEMORY CARD INTERFACE UNIT (FLUSH MOUNT)
DWG.No.	C3532-G04- B	19-023-300G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.





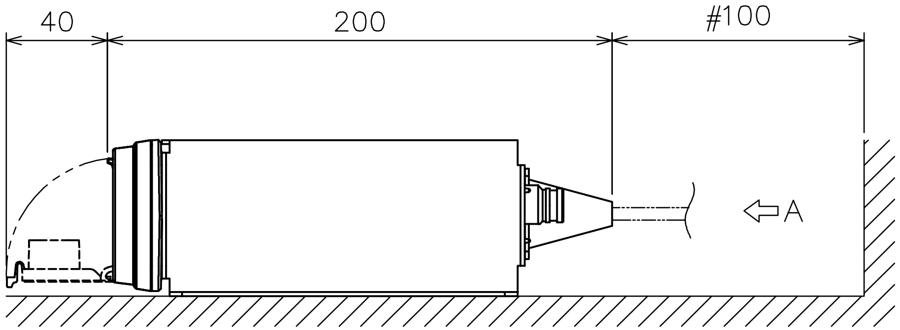


表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

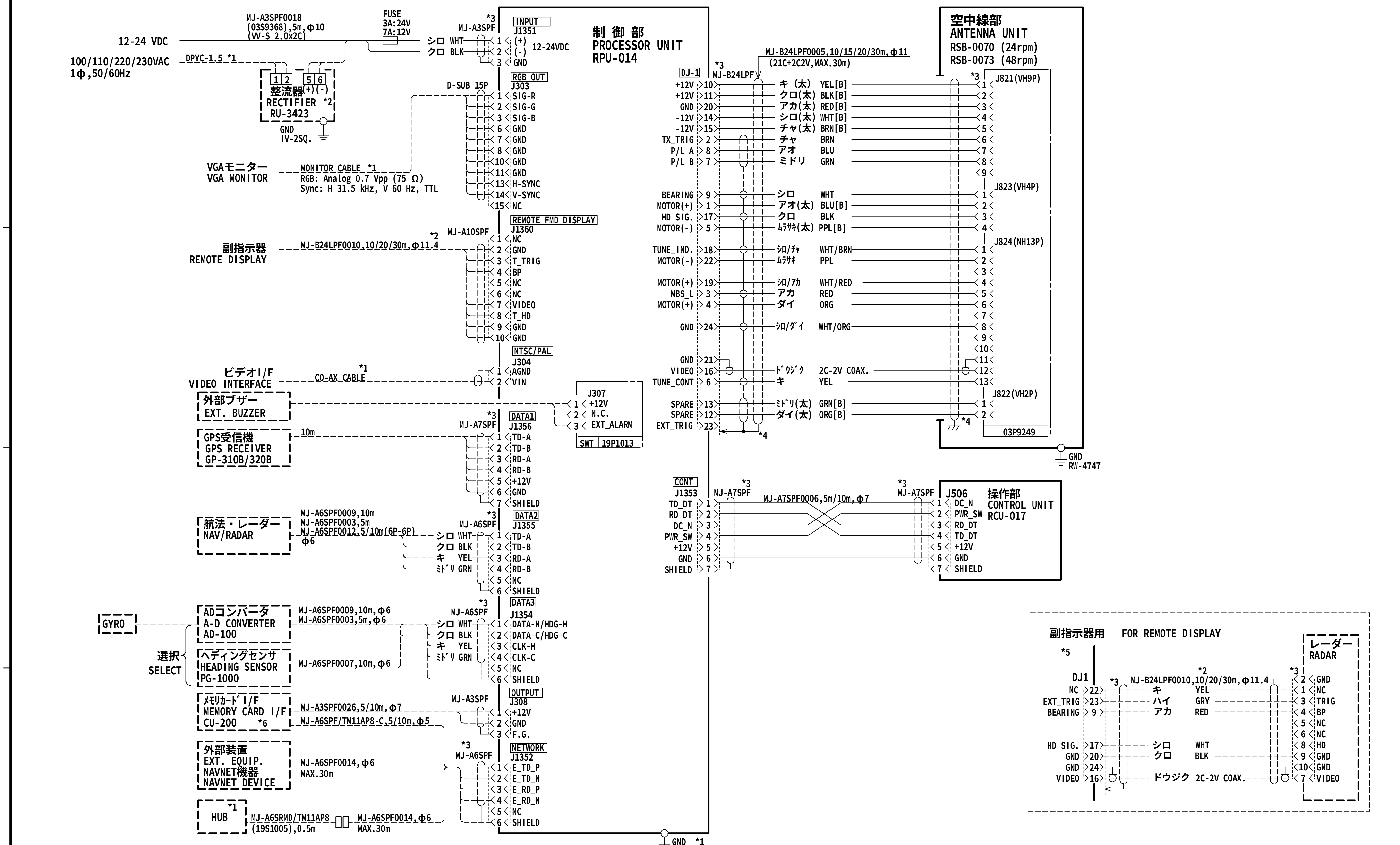
注　記　1）　＃印寸法は最小サービス空間寸法とする。
2）　指定外の寸法公差は表１による。
3）　取付用ネジは＋トラスタッピンネジ呼び径５×２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5X20 FOR FIXING THE UNIT.

DRAWN	Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE CU-200
CHECKED	TAKAHASHI. T	MODEL 1833C	名称 防水型カードインターフェイス(卓上装備)
APPROVED	Y. Hatai	MODEL 1833C-BB	外寸図
SCALE 1/3	MASS 1.3 ±10% kg		NAME MEMORY CARD INTERFACE UNIT (TABLETOP MOUNT)
DWG.No.	C3532-G05- B	19-023-310G-1	OUTLINE DRAWING

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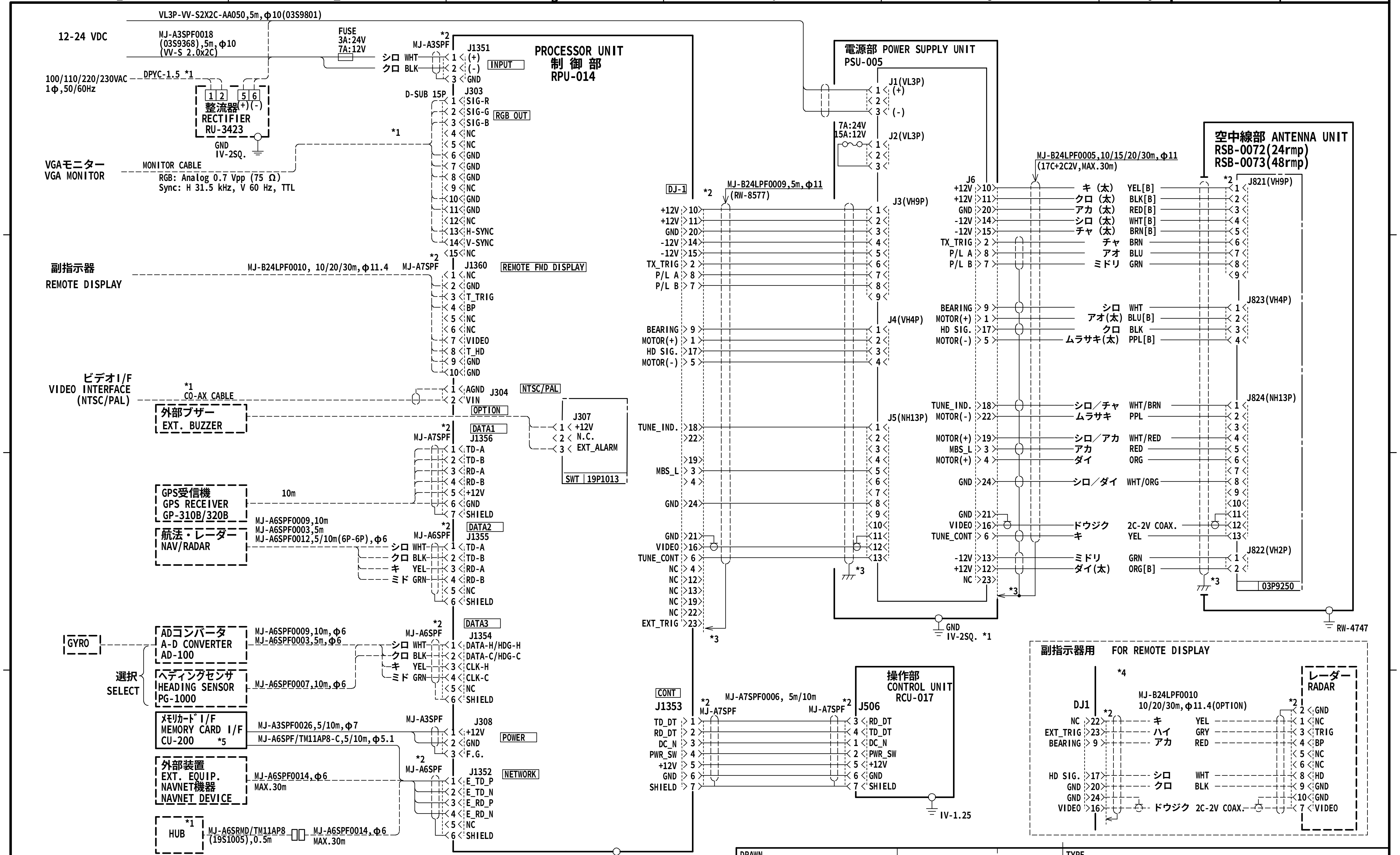


注 記
*1）造船所手配。
*2）オプション。
*3）コネクタは工場にて取付済み。
*4）シールドは両ユニット側で完全に接地すること。
*5）副指示器として使用する場合は、指示器の内部設定を変更する。
*6）輸出仕様のみ。

NOTE
*1. SHIPYARD SUPPLY.
*2. OPTION.
*3. CONNECTOR PLUG FITTED AT FACTORY.
*4. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*5. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
*6. OVERSEAS SPECIFICATION ONLY.

DRAWN Nov.18,'04	E.MIYOSHI	TYPE	MODEL 1933C-BB/1943C-BB
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No. C3532-C01- F	19-023-5002- 4		INTERCONNECTION DIAGRAM

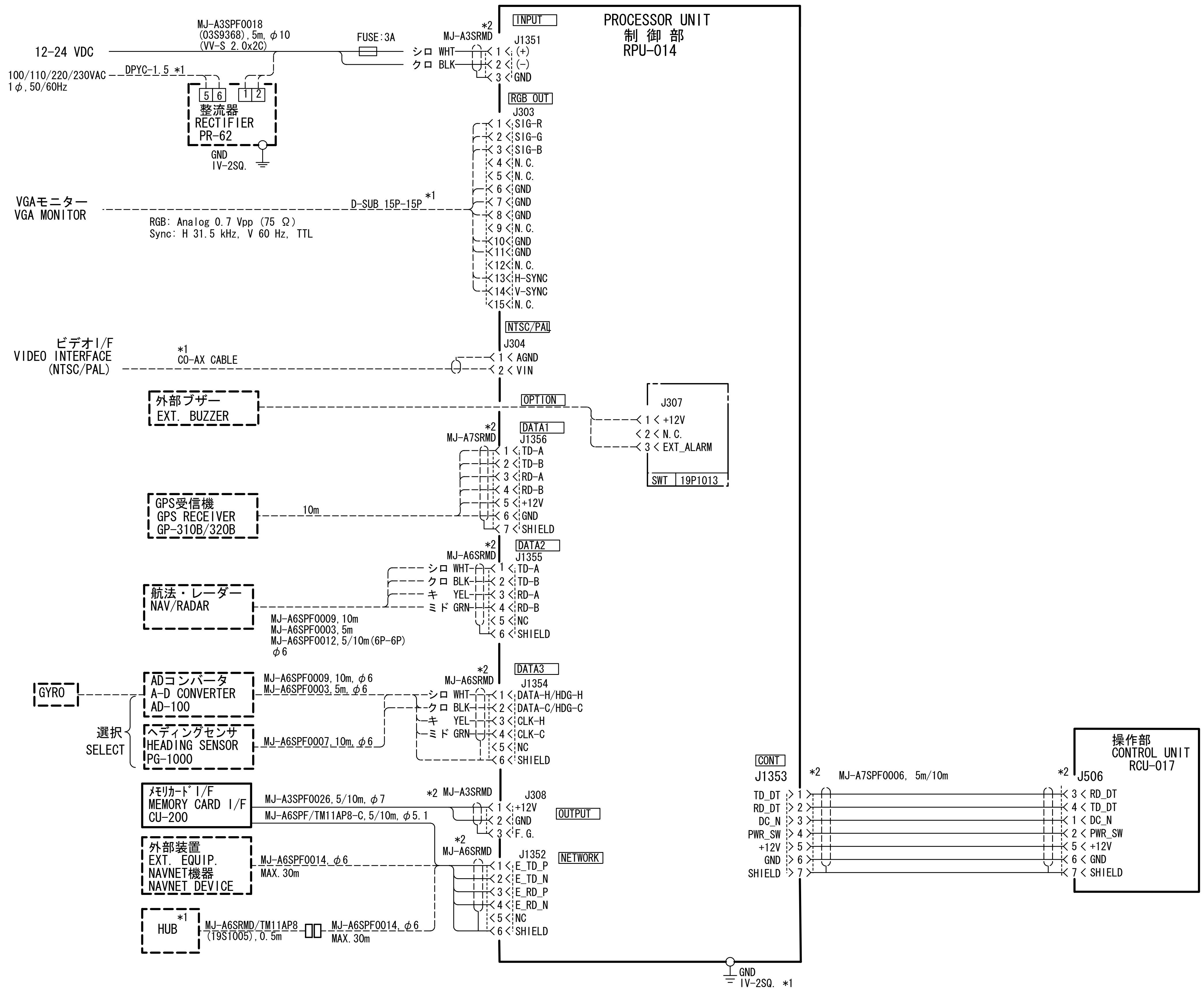
FURUNO ELECTRIC CO., LTD.



注 記
*1）造船所手配
*2）コネクタは工場にて取付け済み。
*3）シールドは両ユニット側で完全に接地すること。
*4）副指示器として使用する場合は、指示器の内部設定を変更する。
*5）輸出仕様のみ。

NOTE
*1. SHIPYARD SUPPLY.
*2. CONNECTOR PLUG FITTED AT FACTORY.
*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
*5. OVERSEAS SPECIFICATION ONLY.

DRAWN	MAY 19, '05 E. MYOSHI	TYPE	MODEL 1953C-BB
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No.	C3533-C01- F 19-023-5000- 5		INTERCONNECTION DIAGRAM

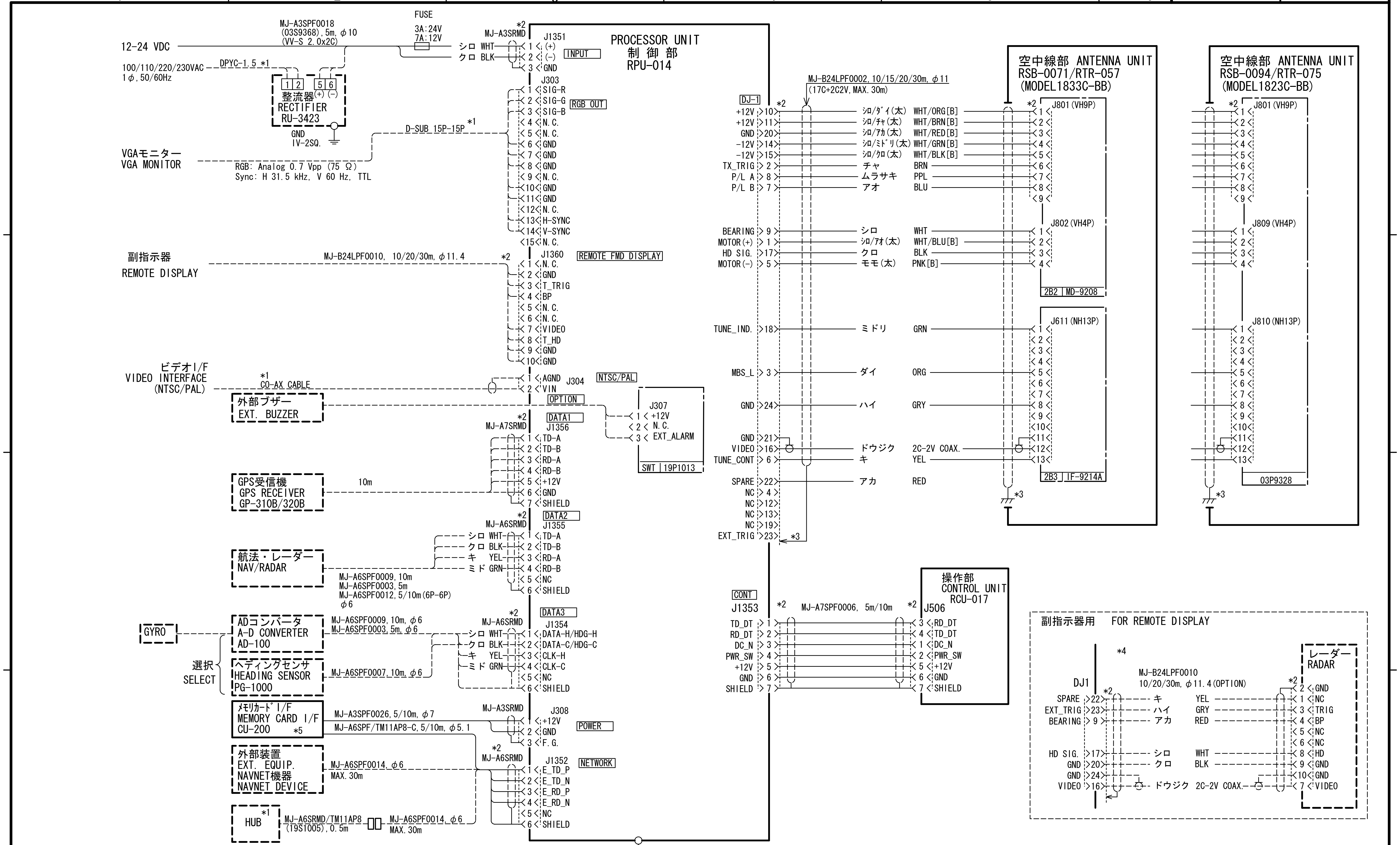


注 記
*1) 現地手配
*2) コネクタは工場にて取付済み。

NOTE
*1. LOCAL SUPPLY
*2. CONNECTOR PLUG FITTED AT FACTORY.

DRAWN 20 Feb. '04	K.MIYAZAWA	TYPE	GD-1900C-BB
CHECKED	TAKAHASHI.T	名 称	カラービデオプロッタ
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	COLOR VIDEO PLOTTER
DWG.No.	C4428-C01- C	19-023-5003- 2	INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.



注 記
*1）造船所手配
*2）コネクタは工場にて取付済み。
*3）シールドは両ユニット側で完全に接地すること。
*4）副指示器として使用する場合は、指示器の内部設定を変更する。
*5）輸出仕様のみ。

NOTE
*1. SHIPYARD SUPPLY.
*2. CONNECTOR PLUG FITTED AT FACTORY.
*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A REMOTE DISPLAY.
*5. OVERSEAS SPECIFICATION ONLY.

DRAWN May 28 '04	K.MIYAZAWA	TYPE	MODEL 1823C-BB/1833C-BB
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー
APPROVED	Y. Hatai		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No. C3531-C01- D	19-023-5001- 2		INTERCONNECTION DIAGRAM